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Prehistoric Uttar Pradesh

(A STUDY OF OLD STONE AGE)

P.C. PANT
Department of Ancient Indian
History, Culture and Archaeology
Banaras Hindu University

1982
AGAM KALA PRAKASHAN
DELHI

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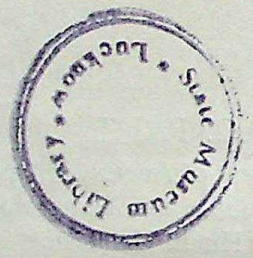

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To my father

Late Shri Ganga Datt Pant

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Preface

The present monograph, the first in the proposed series entitled *Prehistoric Uttar Pradesh*, is an attempt to describe and discuss the palaeolithic industries of the province. It is in fact a modified version of my Ph.D. dissertation—*Palaeolithic Industries of Southern Uttar Pradesh*, submitted to the Banaras Hindu University.

Uttar Pradesh is one of the biggest provinces of India with at least three clearly defined geographical and geological zones, *viz.*, the Himalayan ranges in the north, the vast Gangetic plain in the middle, and the hilly tract of the Kaimur and the Vindhyan ranges in the south. However, in spite of the intensive investigations made from time to time in the province since the later half of the nineteenth century, the prehistoric remains of the Stone Age have yet to be traced in the Himalayas, and, almost all the industries, which have been brought to light so far, come from the southern hilly tract. No doubt, during the last one decade or so, some Stone Age cultures have been traced also in the Gangetic plains, but none of them seems to belong to the Palaeolithic Period. Thus, the Old Stone Age archaeology of Uttar Pradesh is in fact the history of the palaeolithic cultures of the southern hilly regions. This monograph evidently discusses these very industries, and no attempt has been made to throw light on even the geological and geographical features of either the Himalayas or the Gangetic alluvium of the province.

Uttar Pradesh was put in the palaeolithic map of India by Mr. J. Cockburn in the later half of the nineteenth century, when he discovered a lithic industry in the Singrauli basin in Mirzapur district. The area was re-examined by a team led by late Prof F.E. Zeuner in 1949, heralding a new era of palaeolithic research in this part of the sub-continent. In subsequent years, besides the Prehistory Branch of the Archaeological Survey of India and the Deccan College, Pune, the Allahabad University under Prof. G.R. Sharma and the Banaras Hindu University, represented by this author, conducted extensive explorations in Mirzapur, Allahabad, Banda, Hamirpur, Jhansi and Lalitpur districts, and brought to light a very large number of Stone Age sites, including the famous Acheulian locality of Lalitpur, the rich pebble tools factory site of Lahchura, and the remarkably well-preserved Quaternary deposits on the Belan.

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I started working on the Palaeolithic Archaeology of Uttar Pradesh as early as in 1961, when some parts of the Banda district were selected for preliminary investigations. I have been conducting field surveys in different parts of southern Uttar Pradesh since then, the latest among them being a detailed examination of the Son deposits, between the villages Chatarwar in the west and Chopan in the east, in Mirzapur district, in March-April 1981. As a result of the field investigations carried out by the above institutions, a considerably large number of Stone Age industries has come to light. However, a detailed account of the palaeolithic sites of Uttar Pradesh and the industries associated with them is still awaited. No doubt, a few articles has appeared from time to time, pointing out to the great potentialities of the region, but, they have hardly succeeded in underlining the precise nature and cultural significance of the various Stone Age industries. The present monograph is an humble attempt in this direction, and makes a detailed study of the different palaeolithic industries of Southern Uttar Pradesh, with a marked emphasis on their techno-typological characteristics. Initially, I had intended to include the rich collections made by the Allahabad University also in my research. Unfortunately, this could not be accomplished, as these collections were not available to me for study. The present monograph, thus, embodies mostly the results of my own field observations.

The book has been divided into six chapters. The first chapter—Introduction, is a sort of background to the subsequent study, and deals with the geographical and geological features of the region, a brief history of the palaeolithic research in Uttar Pradesh, and the methodology and terminology adopted in the monograph. The second chapter is devoted to stratigraphy, in which various river sections and the deposits of the excavated sites have been dealt with separately, and an attempt has been made to describe different strata objectively. The chapters third, fourth and fifth contain description and discussion of the Lower, Middle and Upper Palaeolithic industries, respectively. It is heartening to note that the industries of all the three phases exhibit some new tool traditions. Thus, the Lower Palaeolithic phase was found to have two sets of industries in Uttar Pradesh, *viz.*, the true pebble tool industries of the chopper-chopping tradition, and the Acheulian industries of the handaxe-cleaver tradition. The pebble tool tradition seems to have continued also in the Middle Palaeolithic phase in a limited measure, though most of the industries of this phase appear to belong to the 'Denticulate Mousterian' category. The Upper Palaeolithic of Uttar Pradesh shows a definite evidence for bladelets and microliths, along with a large number of other tool types. The last chapter of the monograph is that of general discussion and conclusion, in which an attempt has been made to examine the evidence for the various palaeolithic phases of Uttar Pradesh in an all-India and world perspective. Naturally, the emphasis here is on identity or similarity of tool types, frequency of their occurrence, etc. Most of those cultures of Europe, Africa and Asia, which hardly exhibit any noticeable similarity with those of Uttar Pradesh, have been either completely left out of the comparative study, or simply mentioned without going into their details. As per studies carried out so far by different scholars the various

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Acheulian industries of Peninsular India show almost identical characteristics, and the same is the case also with the Middle Palaeolithic ones. Hence, they have been treated simply as two groups of industries in the discussion, and no attempt has been made to compare these individually with those of Uttar Pradesh.

I shall be obliged to the scholars, who will point out to me the limitations of the present study, so that I can avoid similar mistakes in my subsequent writings.

P.C. PANT

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Acknowledgement

Before I acknowledge the assistance of many friends and students who contributed significantly to the completion of this work, I regard it my sincere duty to express my gratitude to my different teachers of Archaeology, *viz.*, Prof H. D. Sankalia, who initiated me to the discipline of Archaeology and Prehistory, Prof A.K. Narain, to whom I owe probably my entire academic career, Prof H. Schwabedissen, whose *Vorlesungen*, *Uebungen* and Seminars helped me understanding European methodologies of research, and Prof Anand Krishna, who supervised my Ph.D. dissertation. My friend Dr Gerhard Bosinski of the University of Cologne, West Germany, helped me learning various complexities of techno-typological analyses, and gave me an opportunity to participate in his excavations of the palaeolithic sites. To him I am greatly indebted. I wish to put on record that I received good wishes and co-operation of all my colleagues all through my research, particularly Prof K.K. Sinha and Dr J.N. Tiwari. Dr. Tiwari spent quite a bit of his valuable time in going through the entire manuscript and making very useful corrections in the draft. I am grateful to them. My former student and present colleague Dr. (Miss) Vidula Jayaswal assisted me in the field work, classification of the material, and preparation of the tables. She not only prepared almost all the line drawings for this monograph, but also permitted me to make use of her detailed notes on the Lalitpur material. She deserves my sincere thanks and good wishes. During the course of my research I frequently visited Dr M.S. Srinivasan and Dr V.K. Gairola of the Geology Department, Banaras Hindu University, to discuss different problems relating to geology. They always obliged me willingly. I extend my thanks to Shri S.C. Ghildiyal, Shri B.N. Pathak and other members of the Indology Library, Banaras Hindu University, who were always prepared to help me by their efficient library service. My friends, Late Shri K.D. Misra and Shri S.C. Singh Rana conducted preliminary laboratory tests on some of the soil samples. I am grateful to both of them. Thanks are also due to Shri O.P. Khaneja, who prepared the photographs. I gratefully acknowledge the assistance of Shri Lalta Mishra in the preparation of line drawings, particularly the map and the Section 1. I wish to extend my thanks to all my colleagues and students who assisted me in the tedious field-trips on different occasions. To my wife Kamala, I only tender my apologies for my unpunctualities and neglects she had to bear all these years. I am grateful to Shri Agam Prasad of the Agam Kala Prakashan for publishing the monograph neatly and expeditiously.

P.C.P.

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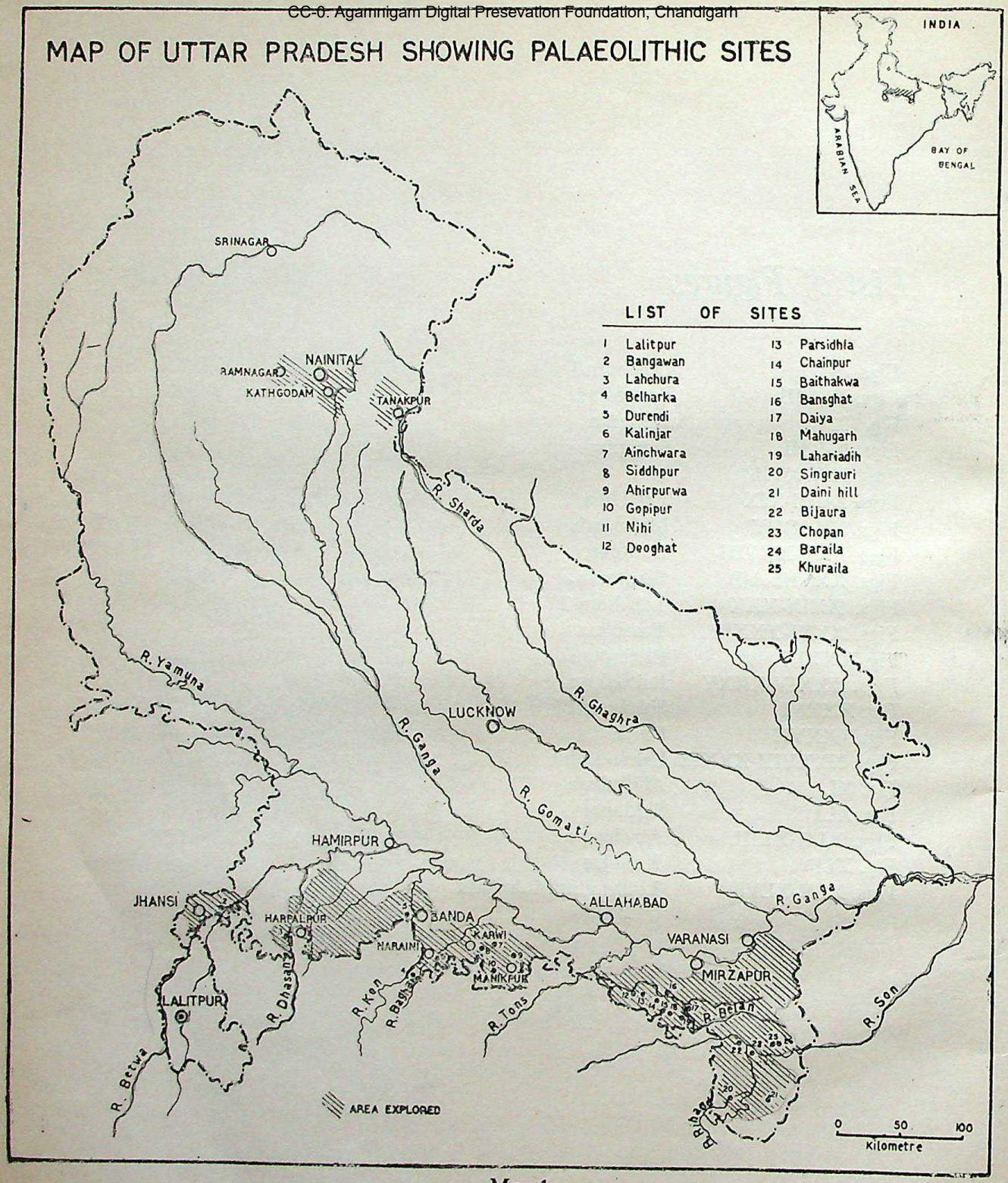

Map 1

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CHAPTER I

Introduction

This chapter is intended to serve as a background to the principal subject of our study—the description and discussion of the various palaeolithic industries of Uttar Pradesh. It is divided into three parts, which deal respectively with the geographical and geological features of the region, a brief history of the palaeolithic research in Uttar Pradesh, and the methodology and terminology adopted in the monograph.

Although Uttar Pradesh has been known for yielding palaeolithic remains for a century now,[1] all the sites discovered so far are located in the region lying south of the Yamuna and the Ganga, and streching over whole or parts of Varanasi, Mirzapur, Allahabad, Banda, Hamirpur, Jhansi and Lalitpur districts (Map 1). It is true that no organised efforts have been made as yet to trace the Stone Age remains in other parts of the province, particularly the Himalayas and their foot-hills, where one can justifiably expect to find such localties. But, the sporadic explorations, undertaken from time to time by different individuals, have hardly proved fruitful so far. This author himself surveyed the areas along the Kosi, near Ramnagar and Kathgodam, and the Sharda, near Tanakpur in Nainital district. Though he noticed important river sections, characterized by various Quaternary deposits, yet he unhesitatingly admits that he failed to find any genuine prehistoric artefact. Recently, K.P. Nautiyal claimed to have found some palaeoliths of the chopper chopping-tool tradition in the terraces of the Alakhnanda, near Srinagar, Garhwal.[2] However, in the absence of actual specimens, most of the scholars were rather sceptical to accept them as artefacts. The prehistoric industries, located in parts of the Gangetic plain during the seventies, are primarily microlithic in character.[3] Whether some of them may also

1. Cf. Cockburn, J., *PASB*, 1883, pp. 125-26; *PASB*, 1884, pp. 141-43; *JAI*, Vol. XVII, 1888, pp. 57-65; *JASB*, Vol. LXIII, 1894, pp. 21-27, etc.
   The history of palaeolithic research in Uttar Pradesh has been discussed in detail elsewhere in this chapter.
2. Nautiyal, K.P., *et al.*, 'Palaeolithic Industries from the Lower Alakhnanda Valley', paper read at the Seminar '*Indian Prehistory*-1980', held at Allahabad in November/December 1980.
3. Sharma, G.R., 'Seasonal Migrations and Mesolithic Lake Cultures of the Ganga Valley', Presidential address, *Indian Prehistoric Society*, Delhi, 1975.

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be assigned to the Palaeolithic period is to be determined only by future intensive researches. Thus, in view of the location of sites, it may be safely held that the Prehistory of Uttar Pradesh is actually the story of the Stone Age of the southern hilly tracts of the province. It is particularly true with reference to the palaeolithic history of Uttar Pradesh. Hence, an account of only the southern parts of Uttar Pradesh in the following pages.

I

GEOGRAPHICAL AND GEOLOGICAL FEATURES

By Southern Uttar Pradesh we mean that region of the province which lies roughly south of the Yamuna upto Allahabad, and south of the Ganga further east upto Varanasi district. Starting from the west it includes the districts of Jhansi and Lalitpur (between the parallels of 24° 11′ and 25° 50′ north latitude), Hamirpur (25° 7′ to 26° 7′ north latitude), Banda (between latitudes 24° 53′ and 25° 55′ N), the southern part of Allahabad district (between 24° 78′ and 25° 48′ N latitude), Mirzapur district and the Chakia *tahsil* of Varanasi district (both lying between the parallels of 23° 88′ and 25° 32′ N latitude). The district Jalaun, though lying south of the Yamuna, has not been included, since it shows different physiographical features. Besides, it has not yielded any palaeolithic remains so far, to the best of our knowledge. The eastern boundary of the region is formed by the Shahabad and Palamau districts of Bihar, while towards the south lie, from east to west, the districts of Surguja, Sidhi, Rewa, Satna, Panna, Chhatarpur, Tikamgarh and Saugor (or Sagar) of Madhya Pradesh. On the west, Southern Uttar Pradesh is bounded by the Saugor, Guna and Shivpuri districts of Madhya Pradesh.

The whole region presents a somewhat uniform topography. All through the east-west axis, the southernmost part is covered by hill ranges of various magnitudes, which become increasingly frequent as one approaches further south. Then there is the upland of this hilly tract, sometimes called *Patha*, which is composed of disintegrated rocks. North of the hills lies a long stretch of alluvium upto the Yamuna and the Ganga, which is hardly different from that of the Great Gangetic plain. Thus, the land-scape presents a general gradient from south to north, which is steep in the hilly tract and gentle when one approaches the Yamuna and the Ganga. As a result, all the rivers, except the Son and the Belan, flow roughly south to north, or, to be more precise, from south-west to north-east.

GEOLOGY

Southern Uttar Pradesh forms an important geologic complex, in which the rock-exposures of almost all the noteworthy periods, right from the Pre-Cambrian to the Tertiary, are represented. The history of the Quaternary period is attested to by the alluvial deposits, sometimes also noticed in the form of river-sections. The five

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major formations, referred to by Singh with reference to the southern uplands of eastern Uttar Pradesh,[1] can be identified in more or less the whole area of our study. They are : (1) the Archean Metamorphics; (2) the Bijawars, mixed sedimentaries with igneous intrusions and consequent metamorphism; (3) the Vindhyans; (4) the Gondwanas; and (5) the Recent Alluviums.

The Archeans

They are composed of mainly the gneisses, granites, schists and slates, occupying the southern part of the Dudhi *tahsil* in Mirzapur district, southern and south-eastern parts of Hamirpur district, and large portions of Jhansi and Lalitpur districts. In Banda, the Archean gneiss is visible only at Kalinjar, where the Kaimur sandstone lies directly over it. In fact these Archean formations underlie all the subsequent deposits throughout the region. They are supposed to be pre-Dharwarian and are slightly later than, or even contemporaneous with, the oldest Aravali schists.[2] The whole of Bundelkhand, including Jhansi, Lalitpur, Hamirpur and Banda districts of U.P., is known for the typical rock of this region, popularly termed in geological literature as the 'Bundelkhand gneiss', although this term is a misnomer, since both granite and gneiss are found in the region, and the former in fact predominates.[3] Among the various types of granites, the pink fedsparic, of coarse grained variety is the most dominant in distribution, and massive in character. It is at times traversed by gigantic quartz reefs and numerous basic dykes of dolerite and diabase. Besides, there are some grey varieties. Many of them can be noticed in the higher rocks near Kulpahar in Hamirpur district, where one more variety, having dull green or almost black colour with predominance of hornblende, is also present.[4] There is no fixed pattern in the distribution of gneisses. They vary from medium to coarse grained varieties. The schists and slates are found more often in the southernmost part of the Mirzapur district.

The Bijawars

They are attached to the Dharwarian groups, usually of pre-Cambrian origin. Generally they consist of sandstones, limestones and slates. However, in Mirzapur district, where they occupy an area lying between the Rajkhar scarp and the Son valley, the Bijawars are said to be "composed of gneissose-granites, phyllites,

1. Singh, Kailash Nath, *Southern Uplands of Eastern U.P.—A Study in Landform & Settlement Distribution*, Unpublished Ph. D. thesis, B.H.U., 1968, Chapter VI.
2. Singh, R.L. (ed.), *India : A Regional Geography*, Varanasi, 1971, p. 599.
3. *Ibid.*, also, Singh, Harendra Pal, *Resource Evaluation and Planning Regions in Bundelkhand Region*, Unpublished Ph. D. thesis, B.H.U., 1974, Chapter I.
4. Drake-Brockman, D.L. (ed.), *Hamirpur: A Gazetteer*, Vol. XXII of the United Provinces of Agra and Oudh, Allahabad, 1909, p. 2.

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quartzites, hornblendites, schists, slates, etc."[1] Besides Mirzapur, this series is also found in the form of a narrow strip near Madora in Lalitpur district.[2]

The Vindhyans

This series is marked by the almost horizontally bedding sedimentaries, and is most widely distributed throughout the Southern Uttar Pradesh, with the probable exception of the Hamirpur district. The Vindhyan system forms a series of posing escarpments of massive sandstone and limestone in the Son valley in the Mirzapur district, the area lying south of Karwi in the Banda district, and southern parts of the Jhansi district, The Vindhyan system has been divided into the Lower and the Upper by geologists, with an unconformity between the two divisions.[3] It is found in the form of sandstones, shales and limestones of Bhander, Rewa and Kaimur series in the Chakia *tahsil* of Varanasi, and in the Mirzapur, Banda, Jhansi and Lalitpur districts. At some places, as in the Son valley of the Mirzapur district, Dhandraul quartzites also occur in the deposits of the Vindhyan system.[4] Upper Vindhyans are profusely intruded by lava dykes and sills.[5] All the rock-shelters, explored by us in this region, are in the sandstone deposits of the Vindhyan system. Those occurring on the flat tops of the tiny hill-ranges seem to have been preferred by the prehistoric man for habitation.

The Gondwanas

These Permo-carboniferous formations, represented by Talchirs, tillites, etc., are observed only in the Singrauli basin and a few other places of the southernmost part of the Mirzapur district.[6] Their large part is now submerged under the Pant Sagar reservoir of the Rihand dam. Thus, the Gondwanas exhibit very little significance in the topography of Southern Uttar Pradesh.

The Recent Alluviums

There are large scale alluvial deposits throughout the Southern Uttar Pradesh. Generally, they are supposed to be of Quaternary origin. The alluvial sediments are of fluviatile and subaerial formations of sand, silt.and clay in varying proportions. Most of the deposits of the hilly tract are generally coarse and deficient in clay particles, but the texture becomes more and more refined, as one proceeds northwards. In the south, the alluvium is strewn with the rocky wastes of the hills.

1. Singh, Kailash Nath, *op. cit.*, p. 188.
2. Drake-Brockman, D.L. (ed.), *Jhansi : A Gazetteer*, Allahabad, 1909, p. 4.
3. Wadia, D.N., *Geology of India*, (Third edition), London, 1951, p. 127 ff.
4. Singh, Kailash Nath, *op. cit.*, p. 190 ff.
5. Singh, R.L. (ed.), *op. cit.*, p. 599.
6. Singh, Kailash Nath, *op. cit.*, pp. 192-93.

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Besides the above formations, mention may also be made of the fringing portion of the great spread of basalt constituting the Malwa Trap, which just reaches the Lalitpur district near Sonrai.[1]

SOILS

The soils of the region of our study can be broadly divided into three—Upland soils, Lowland soils, and Riverine soils.[2]

The soils of the upland are mostly *in situ*, and are found on the Vindhyan plateau. They are entirely disintegrated sandstone, overlying a sub-stratum of rock. In texture, they vary from clay-loam to sandy-loam.

The lowland soils were formed partly *in situ*, and partly by transporting agencies like streams. The latter contains the detritus of the Deccan trap also. There are four important soil-types in the lowland, *viz.*, *Mar*, *Kabar*, *Parua* and *Rankar*. The first two are black soils, distinctive of central India. *Mar* is more calcarious and black than the *Kabar*. *Parua* and *Rankar* are the yellow and red soils of the region. The first one is a light sandy soil with high alkali content. *Rankar*, on the other hand, is full of large *kankar* nodules. It is generally found on the edges of ravines or where there is a slope in the ground.[3]

Riverine soils contain fragments of many rocks. They grade from coarse-sand to fine-clay, and are said to be of two types, *viz.*, *Kachhar* and *Tari*.

RIVER SYSTEM

The rivers of Southern Uttar Pradesh belong either to the Yamuna or to the Ganga systems. The important rivers of the region are Betwa, Dhasan, Ken, Paisuni, Baghain, Tons, Belan, Son, Rihand, Kanhar, Chandraprabha and Karamnasa. Except the Son and the Belan, all the others flow roughly from south to north. The Son divides the Mirzapur district roughly into two parts, and flows from west to east in a valley. The Belan originates from the Bijaigarh uplands in Mirzapur district and flows roughly east to west for some distance and then turns north-west. It finally meets the Tons, a tributary of the Ganga, after passing through the remaining part of the Mirzapur district and the Meja *tahsil* of Allahabad district. The Betwa, the Ken, the Baghain, and the Paisuni originate from the uplands of Madhya Pradesh and meet the Yamuna at different points. The river Dhasan is a tributary of the Betwa, while the Rihand and the Kanhar join the Son. The rivers Son, Tons, Chandraprabha and Karamnasa belong to the Ganga system. Main rivers and their important tributaries

1. Drake-Brockman, D.L. (ed.), *Jhansi : A Gazetteer*, p. 5.
2. Singh, R.L. (ed.), *op. cit.*, p. 604.
3. Drake-Brockman, D.L. (ed.), *Banda : A Gazetteer*, p. 7.

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are perennial, while the smaller ones contain hardly any water during the winter and the summer seasons. Most of the rivers of the Bundelkhand pass through broken hilly country in their upper courses. In the areas of quartz reefs they very often fall with shear drops of several feet into gorges.

FLORA

The vegetation is generally sparse in Southern Uttar Pradesh, although thick forests are also to be found in patches. On black soils *babul* (Acacia arabica) grows spontaneously, and, in the riverine tracts, there is generally mixed jungle of small and stunted types. *Mahua* (Bassia latifolia) is another common tree of the region. Other important flora of Southern Uttar Pradesh is teak (Tectona grandis), *Salai* (Boswellia thurifera), *dhaman* (Grewia vestita) *papra* (Ficus latifolia), *sej* (Lagerstroemia parvifolia), *dhawa* (Anogeissus latifolia), *tendu* (Diospyros melanoxylon), *chironji* (Buchanania latifolia), *aonla* (Phyllanthus emblica), *Siaori* (Nyctanthes arbor tristis), *ber* (Zizyphus jujuba), *bamboo* (Dendrocalamus strictus), *khirni* (Mimusops hexandrus), *gunj* (Odina wodier), *khem* (Stephegyne parviflora), *karar* (Sterculia urens), *Kawa* or *Kuan* (Terminalia arjuna), *chirol* (Ulmus integrifolia), *makhor* (Zizyphus oenoplia), *ghont* (Zizyphus xylopyra), *haldu* (Adina cordifolia), *saj* (Terminalia tomentosa), *khair* (Acacia catechu), *dhak* (Butea frondosa), *karaunda* (Carissa karondas), etc.[1]

CLIMATE AND RAINFALL

Owing to its roughly central position, Southern Uttar Pradesh has a transitional climate, between the maritime climate of the east coast (Bay of Bengal) and the tropical continental dry type of the west (Rajasthan).[2] The average temperature of the year is slightly higher in the Bundelkhand region (above 25°C) than in the eastern parts. The mercury frequently touches 45°C mark, and at times goes even higher during the summer. The winter is colder in Lalitpur than in other parts of the region.

The mean annual rainfall varies from 750 mm. to 1250 mm., and the average may be taken as 1000 mm. However, the droughts are not infrequent, and, similarly, the precipitation exeeds the annual average sometimes. Nearly 90% of the total precipitation falls between June and September. The remaining months of the year are more or less dry. This unequal distribution of the rainfall during a year is amply reflected by the flora, referred to above. If Stamp's observation is to be relied upon, the Southern Uttar Pradesh occupies almost a central position between the continental climate of the north and the tropical climate of the Peninsula.[3]

1. For details of the flora, see Drake-Brockman, D.L. (ed.) *Jhansi : A Gazetteer, Hamirpur : A Gazetteer, Banda : A Gazetteer, Allahabad : A Gazetteer, Mirzapur: A Gazetteer,* being volumes of the District Gazetteers of the United Provinces of Agra and Oudh, Allahabad, 1909.
2. Singh, R.L. (ed.), *op. cit.*, p. 601.
3. Referred to by Spate, O.H.K. and Learmonth, A.T.A., *India and Pakistan*, Third edition, Metheun and Co., 1967, p. 66 ff.

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II

BRIEF HISTORY OF PALAEOLITHIC RESEARCH IN U.P.

Almost at the same time when Bruce Foote was busy in uncovering the palaeolithic evidence in the south, central and western India, some energetic officials of the British-Indian Government were traversing parts of Southern Uttar Pradesh in search of the cultural remains of the prehistoric man. It all happened during the later half of the 19th century. The three persons, who were mainly responsible for underlining the high potentialities in regard to the stone age history of this region, were Rivett-Carnac, Carlleyle and Cockburn. With the probable exception of the last named scholar, however, their notices were brief and general in nature.

Rivett-Carnac chose Banda district for his investigations. He made particular reference to a number of polished and chipped cells, but he also found a large quantity of 'flint flakes', some of them recovered from *in situ* deposits.[1] Although the investigator did not say so, these flake-implements might have belonged to some phase of the Palaeolithic period.

Carlleyle was more concerned about burrows, sepulchral mounds, cairns and sites of the historical period. But, during his investigations in Mirzapur district, Baghelkhand and Bundelkhand, he came across many 'caves', some of them painted, and stone implements.[2] Some of these stone tools appear to be palaeoliths. The so-called 'caves' are in fact the rock-shelters of the Vindhyas.

The foremost among the first band of investigators was Cockburn, who devoted much time and energy in exploring the various parts of the Kaimur range, including those falling in Mirzapur district. He located a large number of rock-shelters in this hilly tract, and took great pains in tracing and describing various paintings made in some of them.[3] Many of these shelters also yielded stone tools and bones. But the most significant part of Cockburn's researches was his discovery of drift gravels in the Singrauli basin of Mirzapur district, which also yielded palaeolithic implements.[4] This in fact is the first reporting of the occurrence of Lower Palaeolithic

1. Rivett-Carnac, H., 'Stone Implements Found in the Banda District', *Proceedings of the Asiatic Society of Bengal*, 1882, pp. 6-8, and 'Collection of Stone Implements from Banda', *Journal of the Anthropological Institute*, Vol. XIII, 1884, pp. 119-120.
2. Carlleyle, A.C.L., 'Notes on Lately Discovered Sepulchral Mounds, Cairns, Caves, Cave-paintings and Stone Implements', *Proceedings of the Asiatic Society of Bengal*, 1883, p. 49.
3. Cockburn, J., 'A Short Account of the Petrographs in the Caves or Rock-shelters of the Kaimur Range in the Mirzapur District,' *Proceedings of the Asiatic Society of Bengal*, 1884, pp. 141-143.
4. Cockburn, J., 'On Palaeolithic Implements from the Drift-gravels of the Singrauli Basin, South Mirzapur', *Journal of the Anthropological Institute*, Vol. XVII, 1888, pp. 57-65.

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implements in stratified deposits in Uttar Pradesh. In the Kon of south Mirzapur, he found some chipped flint implements along with the polished ones.[1] Thus, Cockburn can be said to be the initiator of the palaeolithic research in this part of the sub-continent.

These early researches of the 19th century remained almost unnoticed for a considerably long time, and the work could be resumed only in 1949 when a team of prehistorians under F.E. Zeuner re-explored the Singrauli basin. The results, which did not materially differ from those of Cockburn, were published by Krishnaswami and Soundara Rajan.[2] The Lower Palaeolithic industry found here contained 15% pebble-tools along with those of handaxe-cleaver complex, A hypothesis was put forward that the region was a meeting ground of the Soan culture of the north and the Madras culture of Peninsular India. The view was undoubtedly based upon the observations of the Yale-Cambridge Expedition that the two cultures were confined to the two different regions of the Indian sub-continent.

In the subsequent years the Allahabad and the Banaras Hindu Universities were mainly responsible for carrying out investigations in Southern Uttar Pradesh. The former under G.R. Sharma located three terraces at Bariari near Mau in the Banda district.[3] The finds were mostly palaeolithic. In 1961, the present author found several Stone Age sites in the Karwi and Naraini *tahsils* of the same district.[4] In the mean time Rameshwar Singh of the Deccan College, Poona, worked in the Bundelkhand region and discovered a very rich Acheulian industry at Lalitpur.[5] The site was subsequently excavated by Singh[6] and R.V. Joshi,[7] the latter representing the Prehistory Branch of the Archaeological Survey of India. Both of them also recovered palaeolithic tools from the gravel-beds of the rivers Betwa and Dhasan. Nisar Ahmed, also of the Deccan College, investigated parts of Southern Uttar Pradesh along the Son and found some palaeoliths in the gravels.[8] Subsequently R.K. Verma[9] and the present author,[10] working separately, located a number of palaeolithic sites in the Mirzapur district. In the year 1964, during the course of explorations in the Hamirpur and Jhansi districts, the present author found a true pebble-tool industry at

1. Cockburn, J., 'On Flint Implements from the Kon Ravines of South Mirzapur', *Journal of the Asiatic Society of Bengal*, Vol. LXIII, 1894, pp. 21-27.
2. Krishnaswami, V.D. and Soundara Rajan, K.V., 'Some Lithic Tool Industries of Singrauli Basin', *Ancient India*, No. 7, 1951, p. 40 ff.
3. *Indian Archaeology 1955-56—A Review* (henceforth abbreviated as *I.A.R.*), p.1.
4. Pant, P.C., 'Some Lithic-tool Industries of Banda,' *Bharati Supplements*, No. 2, 1964.
5. Singh, R., *Palaeolithic Industries of Northern Bundelkhand*, unpublished Ph.D. Thesis, Deccan College, Poona, 1965.
6. *Ibid.*
7. *I.A.R.*, 1963-64, pp. 49-51.
8. *I.A.R.* 1962-63, p. 37.
9. *Ibid.*, 1959-60, p. 48.
10. Narain, A.K. and Pant, P.C., 'A Summary Account of Archaeological Explorations in East U.P.—1962-63,' *Bharati*, No. 8, Part I, 1964-65, pp. 128-132.

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Lahchura,[1] which incidently was the first discovery of its kind in Central India. The discovery of an almost complete cliff-section and palaeolithic and later sequence of cultures in the Belan valley by a team of the Allahabad University under G.R. Sharma in the mid-sixties of this century was perhaps the most significant among all.[2] Numerous factory sites of all the phases were also located in the area. In the meantime some rock-shelters were also excavated, providing a useful sequence of cultures. Important among them are Morhana Pahar,[3] Lekhahia,[4] Baghai Khor[5] and Lahariadih.[6] In the seventies various palaeolithic industries were found in Mirzapur, Allahabad, Banda and Jhansi districts by us, as well as, the Allahabad University. Except a few articles, no detailed account of these discoveries has, however, been published so far. The recent publication of the University of Allahabad,[7] dealing primarily with the excavations at Chopani-Mando, Mahadaha and Mahagara, hardly discusses anything significant on Palaeolithic Archaeology, that was not covered earlier by articles, except of course a broad and generalised classification, along with frequency distribution, of the epi-palaeolithic tool-kit from Chopani-Mando, and a brief reference to the industry of Baghore I.

III

METHODOLOGY AND TERMINOLOGY

The present work is primarily aimed at presenting the techno-typological features of the different palaeolithic industries of the three phases. Attempts have also been made to study the stratigraphy of the sites, wherever possible. With such simple end in view, there is hardly any scope for methodological complexities.

The sites, which indicated the existence of artefacts in definite stratigraphical context, were subjected to preliminary scrapings with a view to clearing various horizons. It needs to be emphasized that the scraping did not amount to excavation, not even a trial one. Thus, the data available to us through these probings, though useful, are obviously limited in nature.

With regard to factory sites, so widespread in the area of our study, a different methodology was adopted. As usual, the artefacts were picked up from the surface; but particular care was taken to make the collection representative from both techno-

1. Briefly reported earlier in Misra, V.N. & Mate, M.S. (ed.), *Indian Prehistory—1964*, Poona, 1965, pp. 8-9.
2. *I.A.R.*, 1966-67, pp. 35-37.
3. Briefly reported by R.K. Verma in Misra, V.N. and Mate, M.S. (ed.), *Indian Prehistory—1964*, pp. 73-75.
4. Briefly reported by G.R. Sharma in *Ibid.*, pp. 76-79.
5. Briefly reported by R.K. Verma in *Ibid.*, pp. 73-75.
6. Excavated by the author in April, 1977.
7. Sharma, G.R. *et al.*, *Beginnings of Agriculture*, Allahabad, 1980.

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logical and typological points of view. In case of most of the factory sites, attempts were made to pick up all the artefacts, howsoever small and insignificant they might look, from some selected areas of the site. No attempt, of course, was made to divide the whole site into various squares and to pick up all the pieces from every third, fourth or fifth square, as suggested by some scholars.[1] The investigation of this nature, though undoubtedly commendable, requires a sufficiently big team and resources, which were beyond the means of the present author.

The artefacts obtained from the various stratigraphical horizons of the river-sections were generally not found suitable for detailed techno-typological analyses, at least on two grounds. Firstly, such collections are usually too small for any meaningful analysis. Secondly, most of the artefacts are rolled and heavily patinated, and contain too many retouch-like marks on the edges. It is often very difficult to distinguish between the genuine retouch marks and those that are made on account of transportation by the flowing waters of the stream. Hence, while the evidence provided by the river sections is regarded useful for establishing the relative chronology of the industries of the various phases, it is not so for determining their typological features. For the latter, reliance had to be placed on the collections made from the factory sites, which are usually very rich in artefacts of all the categories. Besides, the specimens in such cases being also unrolled and only lightly patinated, all their techno-typological peculiarities become easily discernible.

Each collection was subjected at first to a broad classification into finished tools, partly retouched specimens, unretouched blanks and cores. The group of finished tools was then elaborately classified into various types, taking into account all the important attributes of every specimen. In fact, our screening of the finished tools may appear an over-classification to some scholars. But this has been intentionally done with a view to projecting, as far as possible, even the minutest typological details. An elaborately classified industry can be always regrouped under major classes, but the *vice-versa* is not possible. Such a classification can be used fruitfully in subsequent comparative studies. The blanks and cores, including those converted into finished and semi-finished tools, were separated into various groups on the basis of the mode of core-preparation. This gives a fairly good idea about the blank-detaching techniques employed in the various industries. Data were also collected with regard to the length and breadth of the artefacts. The broken specimens were mostly excluded from such statistics. However, in the case of some broken blades, where the data on the width at least could be collected, this was done. Sometimes it was found relevant to measure the angle of secondary working, *e g.*, the choppers of the Lower Palaeolithic period. In most of the other cases, the position of secondary working on the various finished tools was noted. This was done particularly with reference to the Middle Palaeolithic industries.

1. Cf. Possehl, G.L., 'An Approach to Surface Collecting', *Radiocarbon and Indian Archaeology*, (ed.) Agrawal, D.P. and Ghosh, A., 1973, p. 462 ff.

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The data, thus, acquired, were presented in the form of tables. In some cases, the same was also presented in the form of bar-charts and histograms with a view to indicating the technological and typological features legibly. Cumulative curves have also been drawn for comparing different industries of the same phase, Thus, we have adopted only simple methods of descriptive statistics, leaving aside the complexities of inferential statistics.[1] The latter, it may be noted, is being advocated now a days by some new archaeologists.[2] But, at least in the sphere of palaeolithic research, these attempts have not been received well so far.

During the last decade or so, a number of books have been published on new archaeology or what is sometimes described as the archaeology of models,[3] although some works written in the forties of this century may also be included in this category.[4] It is peculiar that most of these writings are devoted to the theory of archaeology and the role of models and paradigms in archaeological interpretation, borrowing on the one hand the arguments from Philosophy and Logic and on the other the methodology from Social Sciences, like Sociology and Anthropology, as well as Natural Sciences. In fact, some of them have gone to the extent of treating Archaeology as Anthropology,[5] ignoring all the limitations of the evidence in the former. To the best of our knowledge, nothing concrete has so far been deduced by applying these methods on the palaeolithic material. At times, claims have been made for breaking fresh grounds even in the sphere of palaeolithic research,[6] but the conclusions drawn appear to be very subjective and lack conviction.

It need not be inferred from the above comments that we altogether reject the methods of new archaeologists. In fact, some of their methods, which are based upon the various attributes of the different classes of tool-kit, may be worth trying.

1. For details of the author's approach to the subject, see Pant, P.C., 'Typology in Prehistory', *Puratattva*, No. 1, 1967-68; Jayaswal, V. and Pant, P.C., 'Statistical Studies with Reference to Techniques of Manufacture of Palaeolithic Artefacts', *Radiocarbon and Indian Archaeology* (ed.) Agrawal and Ghosh, pp. 38-53; and Pant, P.C., 'Statistical Methods in Stone Age Typology', Paper read at the Seminar on Indian Prehistory, held at the Deccan College, Poona, in June 1974. (To be published in *Bharati*).
2. For details of mathematical and statistical methods recommended for the use of archaeologists, see Doran, J.E. and Hodson, F.R., *Mathematics and Computers in Archaeology*, Edinburgh, 1975.
3. Four of them may be referred to as representative works : Clarke, David L., *Analytical Archaeology*, London, 1968; Clarke, David L. (ed.), *Models in Archaeology*, London, 1972; Binford Lewis, R., *An Archaeological Perspective*, New York and London, 1972; and Renfrew, Colin (ed.), *The Explanation of Culture Change : Models in Prehistory*, Gerald Duckworth & Co., 1973.
4. For example, Taylor, W., *A Study of Archaeology*, Memoir No. 69, American Anthropological Association, 1948.
5. Cf. Binford, L.R., 'Archaeology as Anthropology', *American Antiquity*, Vol. 28, 1962, pp. 217-25.
6. For example, Binford, L.R. and Binford, S.R., 'A Preliminary Analysis of Functional Variability in the Mousterian of Levallois Facies', *American Anthropologist*, Vol. 68, 1966, pp. 238-295.

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Constellation analysis, proposed by the British school of new archaeologists, may be one of them.[1] But all these methods require the help of computers, something which is not so easily available to the Indian archaeologists. Secondly, fruitful results can be expected only when these methods are applied on the rich excavated material. Under the circumstances we are left with no other alternative but to adopt the approach of orthodox archaeologists, even if it means bearing the rather undeserving label 'reactionary'.[2] Moreover, the archaeology of models deals primarily with the interpretation and explanation of the evidence, and the Indian Prehistory in general, and the Palaeolithic Archaeology in particular, has probably not yet reached that stage.

TERMINOLOGY

We have endeavoured to adopt in the present monograph mostly those terms which have been frequently used in the literature on Prehistory throughout the world. These terms also carry their universally accepted connotations. For example, a hand-axe is always a biface[3] to us. For the various phases of the Old Stone Age or the Palaeolithic period, the well-known three-fold division of Lower, Middle and Upper of the European Prehistory has been adopted. Misra has convincingly defended the use of this terminology in Indian Prehistory more than once.[4] Without repeating the arguments in support of the above European terminology, therefore, it may be simply added that a four-fold division of the Stone Age Cultures on the line of South African Prehistory has now altogether lost its relevance, particularly after the recognition of the Upper Palaeolithic phase in the Indian sub-continent.

Among the terms for denoting various tool-types, only a few require explanation, since most of the others are quite well-known.

Handaxe

Only bifacial specimens, having shapes and other features of this tool-type, have been included under this head. A few sub-types occurring in some of our industries deserve further clarification.

(i) *Partial handaxe* — In this case the usual handaxe-type working appears

1. For details, see Newcomer, M.R. and Hodson, F.R., 'Constellation Analysis of Burins from Ksar Akil', *Archaeological Theory and Practice*, (ed.) Strong, D.E., London and New York, 1973. pp. 87-104.
2. Doran and Hodson, *op. cit.*, p. 4.
3. The term is used by the French prehistorians now a days in preference to the earlier '*Coup-de-poing*'.
4. Misra, V.N., 'Problems of Terminology in Indian Prehistory', *Eastern Anthropologist*, Vol. XV, No. 2, 1962, pp. 113-24; in *Indian Prehistory-1964*, (ed.) Misra and Mate, pp. 46-47; and in *Radiocarbon and Indian Archaeology*, (ed.) Agrawal and Ghosh, pp. 506-507.

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on one of the surfaces, while the other surface is not fully worked and bears only a few negative scars.[1]

(ii) *Ficron* — It has a general form of a lanceolate or even Micoquian hand-axe, but its edges are less carefully worked.[2] Very often the under-surface is flat.

(iii) *Limande* — This sub-type is somewhat pointed on both the ends (proximal and distal).[3]

(iv) *Backed handaxe* — In the case of this sub-type, one of the longer axes is thick as a result of secondary working or primary preparation, while the other side remains sharp. The shape on plan is that of a usual handaxe but the cross-section is triangular. This type has been reported from the various layers of La Micoque.[4]

(v) *Pseudo handaxe* — This type appears in the Mahugarh industry only. It is thoroughly worked like a handaxe on the dorsal surface, while the ventral contains a few haphazard marks of primary working only. In shape, it resembles a handaxe, but it cannot be classified as a true handaxe on account of its unifacial secondary working.

Cleaver

There are only flake-cleavers in our industries. No flake has been termed as a cleaver unless it bears typical working on the sides and/or the butt. They have been further classified on the basis of their cross-section and mode of secondary working.

Pebble-Tool

Several attempts have been made during the last few years to redefine the various types of pebble-tools.[5] But we still regard the chopper chopping-tool terminology, proposed by Movius in 1948, simple and most appropriate.[6] Besides, it is this terminology which is still frequently used by prehistorians almost throughout

1. '*Biface Partiel*' of Bordes. See Bordes, F., *Typologie du Paleolithique Ancien et Moyen*, Bordeaux, 1961, p. 67.
2. *Ibid.*, p. 58.
3. *Ibid.*, p. 63.
4. Peyrony, D., 'La Micoque. Les Fouilles Recentes. Leur Signification', *Bulletin de la Societe Prehistorique Francaise*, Vol. 35, 1938, pp. 257-88.
5. Sen, D., 'The Sohanian and the Pebble-Tool Terminology in India', *Man in India*, Vol. 37, No. 2, 1957, pp. 157-59; Paterson, T.T. and Drummond, H.J.H., *Soan the Palaeolithic of Pakistan*, Karachi, 1962 and Ghosh, A.K., 'The Palaeolithic Cultures of Singhbhum', *Transactions of American Philosophical Society*, Vol. 20, p. 27ff., etc.
6. Movius, H.L., Jr., 'The Lower Palaeolithic Cultures of South-eastern Asia, '*Trans. Am. Philos. Soc.*, No. 38, Pt. 4, 1948, pp. 329-420.

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the world. We further classified the choppers and chopping-tools on the basis of their worked edges.

Side-Scraper

No flake, core or nodule has been termed as a side-scraper unless it is retouched on at least one of its longer axes. Retouched blades and bladelets have not been included in this type. The side-scrapers have been classified into straight, concave, convex, wavy and the combination of any two of them, on the grounds of their retouched edges.[1]

Among the double side-scrapers, the convergent scraper and the *limace*[2] or the double convergent scraper deserve further clarification. Like other double side-scrapers, a convergent scraper also contains retouch on both the longer sides, but in this case they converge into a rough point. The angle between the two convergent edges is always more than 50°. They are also generally convex. A *limace* is a double pointed tool with convex sides.

Transverse Scraper

This type is made on a broad (or transverse) flake. The retouch appears on the top side lying opposite the bulbar end. It may be further classified into straight, convex and concave.[3] It is a typical tool-type of the Charentian of La Quina, and the Jabrudian of Syria.

End-Scraper

It is made on an elongated flake or a blade with retouch mostly on the distal end at a high angle (between 60° and 80°). The working-end is always convex.[4] However, in some of the Upper Palaeolithic industries of our region, there are some bladelets having end-scraper type retouch on their end. They have also been termed as end-scrapers (micro end-scraper). In the case of ogival variety, the working-end is not exactly convex but forms a subdued point almost in the middle.

Denticulate & Notched Tools

If a flake, core, blade, bladelet or a nodule contains two or more continuous notches on one or more sides or ends, it is a denticulate. If the notches are very

1. Cf. Bordes, F., *Typologie etc.*, Chapter III, pp. 25-30.
2. *Ibid.*, p. 23.
3. *Ibid.*, p. 28.
4. *Ibid.*, p. 31.

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small, the specimen is called micro-denticulate. If these notches are not continuous, the type is a notched tool.[1]

Federmesser

This German term literally means a penknife. Since, the penknife is taken as a particular type of microlith in India, the original German name has been retained to avoid confusion. In the case of this tool-type, usually made on a blade, but occasionally also on a bladelet, one of the sides is convex blunted, while the other is generally unretouched. The curved side is neither as convex as in an Azilian point nor as straight as in a Gravettian point. It resembles to some extent a Chattelperronian point, but is not so broad as the latter. Schwabedissen found *Federmesser* industries widely distributed in the north-western plains of Europe.[2]

Micro-Gravette Point

Made on a long bladelet, it is a smaller and narrower version of the Gravette-point. One of the sides is more or less straight or slightly convex and very abruptly retouched. The proximal end may or may not be retouched.

Burin

This tool has been broadly divided into axial (middle) and offset (side) types, roughly following the suggestions of Newcomer and Hodson.[3] They have been further classified into single stroke, dihedral, burin on truncation, burin on a notch, transverse burin, etc.

All the other terms denoting tool-types are either well-known or self explanatory.

The terms related to various techniques are generally those which have been frequently used in literature on Prehistory. However, a few of them may be explained.

Blank

The term was introduced by Movius and includes flakes, blades, bladelets and chips.[4]

1. *Ibid.*, Chapter V, pp. 35-36.
2. Schwabedissen, H., *Die Federmesser-Gruppen des Nordwesteuropaeischen Flachlandes zur Ausbreitung des Spaetmagdalenien*, Neumuenster, 1954.
3. *op. cit.*, Constellations 2-5 : Typology, pp. 91-93.
4. Movius, H.L., Jr., *et al.*, 'The Analysis of Certain Major Classes of Upper Palaeolithic Tools', *Peabody Museum Harvard University Bulletin*, no. 26, 1968, p. 4.

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Flake

Any blank whose length is less than twice its width is a flake.

Blade

Any blank whose maximum width is more than 12 mm., and whose length is double or more than double its width has been termed as a 'Blade'.[1] It has generally, though not as a rule, a triangular or trapezoidal cross-section.

Bladelet

The length-breadth ratio is the same as in a blade in this case also. But its width is always less than 12 mm.[2]

In denoting techniques, we have not used the term 'Proto-Levallois', since it has been hardly properly defined. The prepared non-Levallois includes all those blanks and cores which contain marks of prior preparation. But this preparation is not in a classical Levallois manner.

EXPLANATION OF TOOL-DRAWING

For the tool-drawing, we have adopted the symbols suggested by Gerhard Bosinski.[3] The shading by dotted lines indicate coarse-grained rock like quartzite and sandstone, while the continuous lines denote fine-grained material like crypto-crystalline silica. The oblique lines are meant for such flaked surfaces in which the direction of flaking is undetermined. The dashes, on the other hand, indicate unflaked surface. The big dot appearing just below the illustrations of blanks denotes the point of contact with the hammer on the under-surface. The blank space indicates modern breaking. All the other symbols are the usual ones.

1. Bordes, F., *Typlogie etc.*, p. 6.
2. Newcomer and Hodson, *op. cit.*, p. 92.
3. Bosinski, G., *Die Mittelpalaeolithischen Funde im Westlichen Mitteleuropa*, Fundamenta A/4, Koeln, 1967.

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CHAPTER II

Stratigraphy

The Quaternary stratigraphy of the region is revealed by only a few localities. The relevant evidence is provided by some cliff-sections found in the river banks, and the excavated habitation areas. The latter generally deals with the concluding part of the Pleistocene and the early phases of the Holocene. As it is the case with most parts of the sub-continent, the Pleistocene stratigraphy is mainly based upon various fluvial, aeolian and subaerial deposits. It is generally believed that the different types of river deposits are the result of either tectonic movements, thalassic changes, or climatic fluctuations.[1] The changes in the sea levels would have hardly influenced the nature of river deposits in our region, since all the rivers of the region belong to the Yamuna or Ganga systems, and none of them joins the ocean directly. During the course of our explorations, we did not also come across any obvious evidence for tectonic movements in the recent history of the region. Hence, it appears to be the climatic fluctuations, which were probably responsible for the different types of deposits found along the river banks.

Several small and big rivers of the Indo-Pakistan sub-continent have revealed cliff-sections containing different types of alluvial deposits. These river deposits are generally in the form of gravels of different sizes, and silts or clays.[2] At times references have been made also to some aeolian deposits.[3] In brief, a certain homogeneity is noticed among the different cliff-sections of Peninsular India. The distinctions among them, if any, are only minor. In fact, most of the important sections contain two or three gravel-deposits, intervened by silt or clay-deposits. Many of them have yielded industries of different Palaeolithic phases. These sections have proved very helpful in establishing a relative chronology of various industries. But, except a few places, for which Carbon[14] dates are available, it has not been possible to give absolute dates to these deposits. Thus, the question of absolute chronology of the

1. Zeuner, F.E., *The Pleistocene Period*, London, 1964, p. 42 ff.
2. Cf. Narmada and Pravara sections. For details, see Sankalia, H.D., *Prehistory and Protohistory of India and Pakistan*, Poona, 1974, pp. 82-83 and 114-118.
3. For example, the deposits of (U) phase in northern and central Gujarat. For details,see Zeuner, F.E., *The Stone Age and Pleistocene Chronology in Gujrat*, Poona, 1950.

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palaeolithic industries of the three phases still remains unsolved. Attempts have been made at times to associate various deposits with different possible environmental conditions. But, in the absence of any reliable evidence, the conclusions drawn still remain tentative. Studies in relation to palaeo-environment throughout the world are mainly based upon palaeontological and palaeobotanical remains, geomorphology, and chemical and mechanical analyses of the sediments.[1] Palaeo-environmental studies are still in infancy in India. Palaeobotanical remains of the Pleistocene period in the form of plant-fossils and pollen-grains have hardly been found so far in any part of the sub-continent. Similarly, detailed sediment analyses are yet to be carried out, though some sporadic preliminary attempts have been made on the river deposits of some areas. No doubt, various river valleys of Peninsular India have yielded mammalian fossils, but even this evidence has failed to give a complete picture of the palaeo-environment and chronology of the Pleistocene. In Europe,[2] North America and, to some extent, even in Africa, different groups of fauna have been precisely associated with various phases of the Pleistocene and the environmental changes. But, the same cannot be said with reference to the fossil fauna derived from various Pleistocene deposits of Peninsular India. For example, a distinction between the mammalian fauna obtained from gravel I and II of the rivers is hardly marked.[3] Nor can it be related to the precise environmental conditions prevailing during the period of formation of the said deposits. Thus, it is almost obligatory to a person studying Pleistocene chronology and palaeo-environments of India to keep the above limitations of the evidence in mind. Further, since such studies come under the sphere of specialists like Palaeontologist, Palaeobotanist, Palynologist and Soil-chemist, a student of prehistory, who has no specialized training in anyone or more fields of these studies, should always find it all the more difficult to attempt an interpretation of this meagre and uncertain data, particularly in the absence of good specialized studies.

In the following pages we describe the stratigraphy of the various sites, as observed by us. The treatment is primarily descriptive, followed by a short discussion on the stratigraphy of each locality. A general discussion appears in the last.

The Belan Valley

Sharma and his associates of the Allahabad University noted various deposits of gravels, sands, silts and clays in the banks of the river Belan and its tributaries, particularly the Seoti, in Allahabad district. Between 1970 and 1977, the area and its deposits were intensively examined by the present author also. The cliff-section

1. For details, see Butzer, K.W., *Environment and Archaeology*, Chicago, 1971, Parts II to IV, pp. 49-270. For climate, soils and vegetation, see also Strahler, A.N., *Physical Geography*, (Indian Edition), 1971, Part III, pp. 219-360.
2. Zeuner, F.E., *The Pleistoncene Period*, Chapter X.
3. Rajguru, S.N., 'Some New Fossil Discoveries from Western Maharashtra, India', *Puratattva*, No. 2, 1968, pp. 16-20.

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is more than 18 metres in thickness. According to Sharma, the sequence of deposits, from top downwards, is as follows.[1]

	Formations	*Associated Industry*
I	Aeolian sub-aerial deposit	Geometric microliths with pottery
II	Aeolian sub-aerial deposit	Geometric microliths without pottery
III	Blackish humus soil	Non-geometric microliths and Upper Palaeolithic tools
IV	Cemented gravel III with calcium and iron nodules etc.	Upper Palaeolithic blade industry
V	Yellow silt (Hill wash), composed of lime carbonate, lateritic nodules, etc.	Tools of Middle Palaeolithic and Upper Palaeolithic (Transitional phase)
VI	Pebble bed	Middle Palaeolitoic Tools (mostly chert)
VII	Reddish sand	
VIII	Sand, cemented sheets and gravels	
IX	Reddish sand	
X	Cemented Gravel II C	Middle Palaeolithic Tools (Chert 80% Quartzite 20%)
XI	Cemented Gravel II B	Middle Palaeolithic Tools (Chert 43% Quartzite 57%)
XII	Cemented Gravel II A	Lower & Middle Palaeolithic Tools (mostly Quartzite) (Transitional phase)
XIII	Mottled clay	Non-implementiferous
XIV	Cemented Gravel I (Boulder Conglomerate)	Lower Palaeolithic Tools
XV	Weathered surface-Laterite	Pre-industry
XVI	Bedrock (sandstone)	

The above section is schematic, and nowhere have all these deposits been noticed at one place. According to our own observation (Section 1), this stratigraphy appears to be more or less correct. However, it may be added that the red coloured gravel-sand deposits are limited to a few places in the Belan basin. Similarly, three clear cut divisions of the gravel II do not form a regular feature of the section In fact, layer Nos. VI to XII seem to belong to one deposit, with bands of sand and evidence for cross-bedding. The cemented gravel I is rarely noticed *in situ*. (Pl. I B).

1. Based on *I.A.R.*, 1966-67, pp. 35-37; Sharma, G.R., 'Stone Age in the Vindhyas and the Ganga Valley', in Agrawal & Ghosh (ed.), *Radiocarbon and Indian Archaeology*, pp. 106-108; and, by the same author, 'Seasonal Migrations and Mesolithic Lake Cultures of the Ganga Valley', Presidential Address, *Indian Prehistoric Society*, Delhi, 1975.

SCHEMATIC SECTION ON BELAN / SEOTI

	DEPOSIT	INDUSTRY	REMARK
1	YELLOWISH SILT WITH SMALL BODIES OF IRON OXIDE (PARTLY AEOLIAN)	STERILE IN THE SEOTI SECTION	MICROLITHS & POTTERY REPORTED FROM THE BELAN
2	LIGHT BROWN SILT	STERILE IN THE SEOTI SECTION	MICROLITHS REPORTED FROM THE BELAN
3	DARK BROWN SILT (PALEOSOL)	STERILE IN THE SEOTI SECTION	EPI PALEOLITHIC TOOLS REPORTED FROM THE BELAN
4	GRAVEL III WITH CALCIUM NODULES	UPPER PALAEOLITHIC (BLADE TOOLS AND MICROLITHS)	LESS COMPACT THAN GRAVEL II
5	YELLOW SANDY SILT WITH CALCIUM CARBONATE CONCRETION	STERILE	pH. VALUE — 10.5 (MIDDLE & UPPER PALAEOLITHIC TOOLS REPORTED FROM THE BELAN)
6	GRAVEL II — GRAVEL-SAND DEPOSIT WITH EVIDENCE FOR CROSS-BEDDING. UPPER PART - RUBIFIED	MIDDLE PALAEOLITHIC — DENTICULATE MOUSTERIAN TOOLS	COMPARES WITH SIMILAR DEPOSITS AT BIJAURA & CHOPAN ON THE SON
7	MOTTLED CLAY	STERILE	RARELY FOUND IN SITU
8	GRAVEL I — BOULDER-COBBLE DEPOSIT	ACHEULEAN TOOLS	RARELY FOUND IN SITU
9	LATERITE & WEATHERED ROCK	STERILE	RARELY FOUND IN SITU

Section 1

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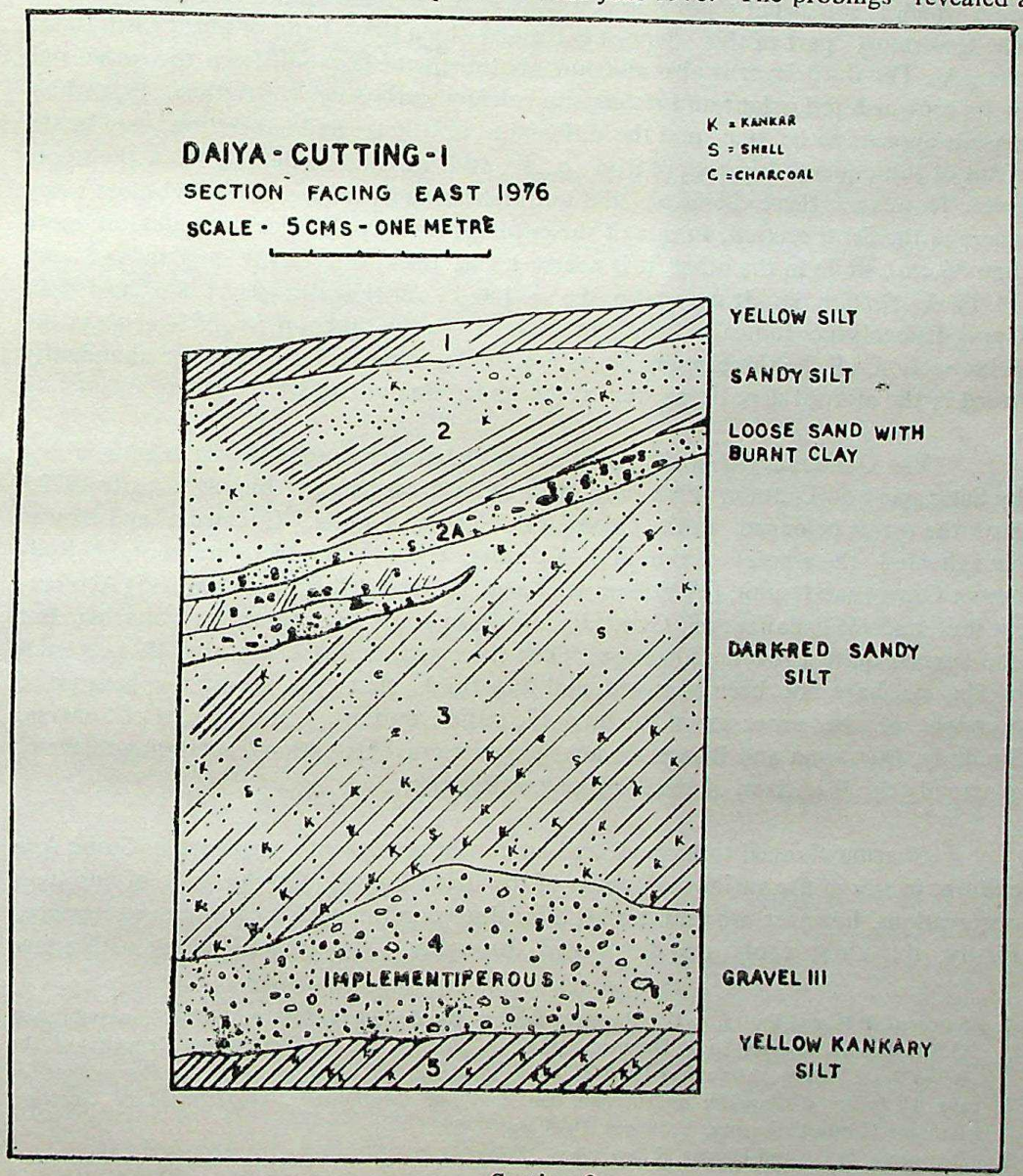
The best example of this deposit can be seen on the right bank of the Belan near Bansghat, hardly a few hundred metres away from the confluence of the Belan and the Seoti (Pl. IA & B). The overlying clay (Pl. IIA) similarly cannot be traced for long distance. In fact these deposits are nowhere found *in situ* along the Seoti.

The upper part of the section on the right bank of the Seoti near the village Daiya was scraped by us at two places in the year 1976. The probings revealed a



Section 2

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somewhat different picture. The layers of the aeolian and sub-aerial deposits and the blackish humus soils of the Belan, noticed by Sharma, are replaced by alluvial deposit, yellowish brown to reddish in colour. The whole deposit overlies the gravel III and measures a little more than three metres (Section 2 & Pl. IV B). It is divisible into three on the grounds of colour and chemical contents. The uppermost deposit is yellowish brown and poor in chemical contents. Immediately below is a layer of alluvium which is somewhat reddish in colour with some concretion of calcium carbonate. The lowermost part of this deposit is formed by a thin band of burnt earth (layer No. 2A). The third layer is also alluvium, but distinguishes itself from the earlier one by its brownish red colour and richness in calcium carbonate concretion. This whole deposit appears to be one, and the difference in colour and concretion may be the result of subsequent leaching of iron oxides and calcium carbonate from the upper levels. However, these chemicals did not reach gravel III and it is very loose every where in the Seoti section. In one of the cuttings, this deposit does not measure more than 80 cm., while in the other, it is nearly 1.5 m. thick, intervened by bands of sand (Pl. IV A; Section 3). It may also be pointed out that this gravel has yielded an Upper Palaeolithic industry, while in contrast to the observation of Sharma in the Belan section, all the three upper layers are sterile. Fresh water shells are abundantly found in the alluvial deposit, as well as the underlying gravel III.

The Quaternary deposits of the river Belan were preliminarily examined first by Satsangi and Dutta in 1968,[1] and then by Dassarma and Biswas in early 1972.[2] Both the teams belonged to the Geological Survey of India. Dassarma and Biswas have divided the whole section into six units, *viz.*, (1) Boulder-clay unit, (2) Red-brown Gravel-sand unit, (3) Yellow sand and silt unit, (4) Pedocal unit, (5) Aeolian-silt unit, and (6) Pedalfer soil. Generally they support the stratigraphy of Sharma, but also suggest quite a few modifications. The three sub-divisions of gravel II, suggested by Sharma, have not been accepted, and they think that it "...is perhaps because of oversight of the processes of the fluviatile sedimentation..."[3] on the part of Sharma. Similarly, Dassarma and Biswas do not recognize gravel III, which, according to them, is actually the B-horizon of the fossil pedocalic soils.

Sharma claimed to have found an almost continuous sequence of Stone Age cultures *in situ* in the various deposits of the Belan Valley. On the basis of our own observations, however, we find it a bit difficult to confirm such a continuous sequence. Firstly, the chert tools are distributed throughout the gravel II along with a few

1. Satsangi, P.P. and Dutta, A.K., 'Progress Report for the Field Season 1967-68', unpublished G.S.I. Report, referred to by Dassarma, D.C. & Biswas, S., in 'Quaternary Deposits of the Belan-Seoti Valleys, Allahabad District, Uttar Pradesh', (ed.) Srinivasan M.S., *Proceedings of the VI Indian Colloquium on Micropalaeontology and Stratigraphy*, Department of Geology, Banaras Hindu Universty, Varanasi, 1976, pp. 33-39.
2. Dassarma, D.C., and Biswas, S., *op. cit.*
3. *Ibid.*

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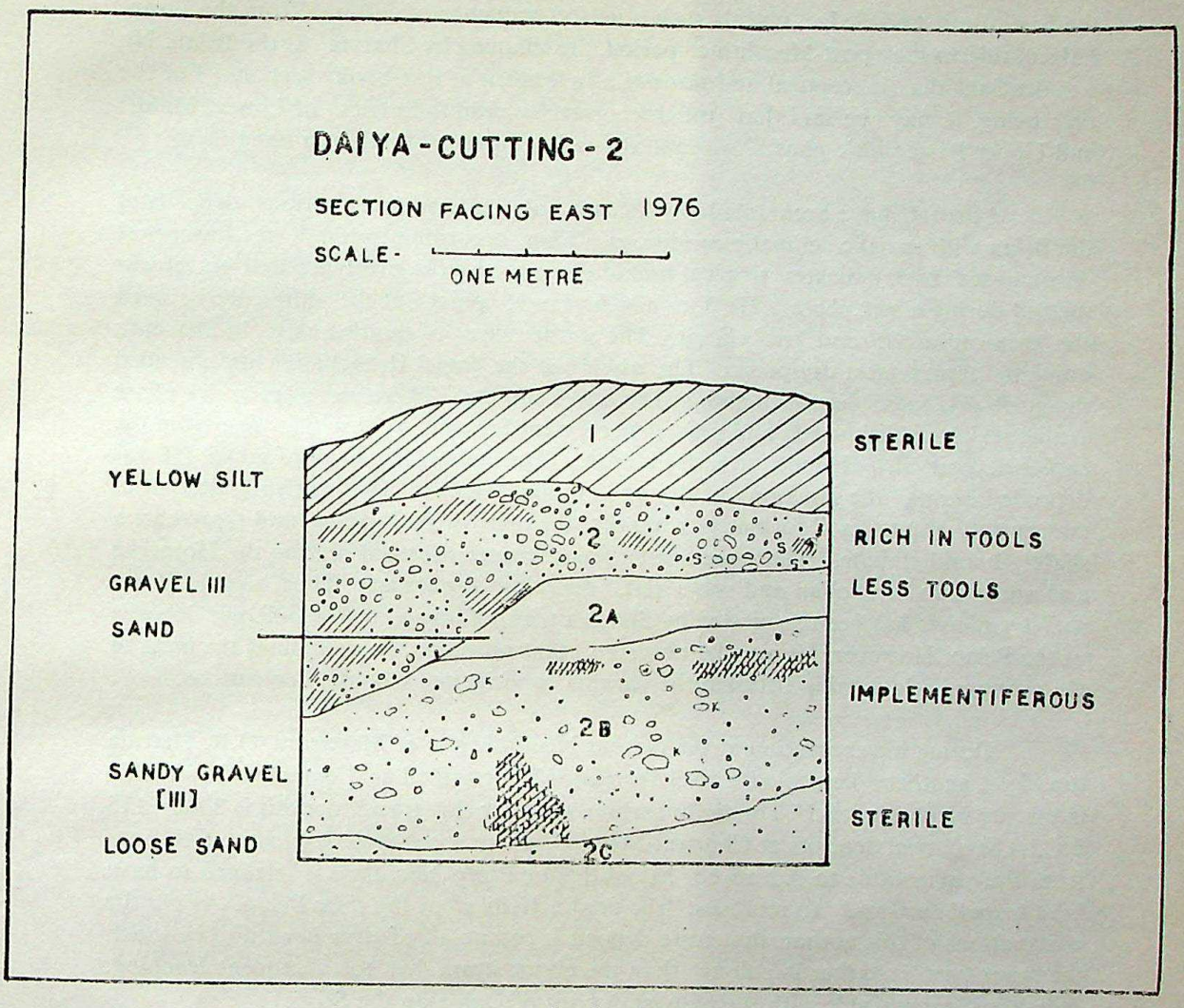

Section 3

quartzite ones. We frankly admit that we did not find any artefact either in the silts or clays. Sharma might have found them in these deposits at some places, but they are certainly not present everywhere. We observed also that, except the first and the third gravels, the artefacts do not appear even in a good number in any of the other deposits. The first gravel is rarely found *in situ*. In our opinion no evolutionary sequence can be built up on the basis of a few specimens. For any such hypothesis a large number of implements found *in situ* in various deposits is an essential requirement. In view of these observations, we suggest that Sharma's cultural sequence should be regarded nothing more than a tentative hypothesis, and should not be pushed too far. It should be borne in mind that no site in the world, at least none to

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the best of our knowledge, reveals such a perfect sequence of cultures from the Lower Palaeolithic to the post-Mesolithic period, as claimed by Sharma at the Belan. No wonder Sankalia is sceptical and sarcastically terms it a 'text-book section'.[1] For the time being, it may be said that the three gravels yield industries of Lower, Middle and Upper Palaeolithic phases, without any visible inter-connections among them.

Attempts have been made by Sharma also to associate various deposits of the Belan with specific climatic conditions. Thus, according to him,[2] the lowermost decomposed rock indicates tropical humid climate, and the overlying first gravel was formed during a wet phase. He does not, however, point out the difference between the 'tropical humid' and 'wet' climate. The sterile layer of mottled clay, in Sharma's opinion, represents a dry phase. The whole of the gravel II, including its so-called three sub-divisions, has been assigned to a wet climate. There was again a dry phase during which reddish sands and gravel sheets were formed. Yellow silt, overlying the earlier deposit, also belongs to a dry climate. The succeeding layer of gravel III was deposited during the junction of dry and humid phases. The overlying deposit of mature soil (humus soil formation) marks the end of Pleistocene, and represents a slightly humid climate. The uppermost deposits were formed during the Holocene and are said to be aeolian and sub-aerial, denoting dry climate. Thus, a cycle of wet and dry phases has been suggested by Sharma with reference to the different deposits of the Belan. However, it may be observed that nowhere he underlines the basis of the proposed relationship between the various deposits and climatic fluctuations.

During his excavation at the famous Neolithic site of Mahagara, G.R. Sharma found yet another 'cemented gravel formation', described as 'Cemented Gravel IV,' in the pre-Neolithic level.[3] The radio-carbon date for this gravel deposit is 8080 ± 115 B.C.[4] The alluvial deposits at Chopani-Mando,[5] where a complete sequence of cultures from Epi-palaeolithic to Advanced Mesolithic or Proto-Neolithic is claimed to have been traced, are said to represent the final activities of the river Belan. As per the observations of this author, the entire deposit is composed of river born silt, in which the lower part is darker in colour than the upper strata due to subsequent leaching. It is, thus, comparable with the alluvial deposit of Daiya on the Seoti.

A bold attempt at interpreting the cliff-section of the Belan has been recently made by Dassarma and Biswas, and their observations are indeed very interesting.[6] The lower deposit of their 'boulder-clay unit' is an "...absolutely unsorted assemblage

1. Sankalia, H.D., *Prehistory and Protohistory of India and Pakistan*, p. 41.
2. Sharma, G.R., 'Stone Age in the Vindhyas and the Ganga valley', in *Radiocarbon and Indian Arahaeology*, pp. 107-108.
3. Sharma, G.R., *et al.*, *Beginnings of Agriculture*, p. 3.
4. *Ibid.*
5. *Ibid.*, pp. 33-76.
6. *op. cit.*

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of blocks and boulders of quartzite and clay, the blocks showing very little movement, can be, at least partly, of solifluction origin."[1] The whole unit was deposited during a cold glacial phase. Before the deposition of 'Red-brown gravel-sand unit', there was an erosional phase in the history of the river. Consequently, most of the first unit was eroded during a humid climate which followed. The aggradation of the 'gravel-sand unit' was the result of relative aridity. The red colour of this deposit was a result of a subsequent prolonged phase of weathering in a hot and humid climate. The overlying deposit of pale yellow silt and silt and sand is said to be, at least partly, of loessial origin, indicating a cold and arid phase. The overlying pedocal unit with good profile development indicates a sufficiently humid climate to form a soil. As mentioned earlier, this unit also includes the gravel III of Sharma. This is the B-horizon of the pedocal unit of Dassarma and Biswas. Thereafter, aridity prevailed again, and the aeolian silt was formed. The pedoalfer soil of the top indicates relatively humid conditions. This scheme of climatic fluctuations of Dassarma and Biswas is quite different from that proposed by other scholars, with reference to the different river-sections of Peninsular India.

Mujumdar and Rajguru also carried out investigations of the Pleistocene sediments of the Belan valley.[2] The analysis was both physical and chemical. They do not try to associate the various deposits with specific environmental conditions of the past. Nor do they attempt to give any absolute chronology. However, they make some significant remarks which, to a certain extent, go against the observations of Dassarma and Biswas. According to Mujumdar and Rajguru, both gravels and silts of the Belan have been deposited through fluvial processes. They also observed that the possibility of finer soils being deposited solely by wind was very meagre. It was also indicated that most of the silts with clay components were deposited under sustained still water conditions. The poor sorting and chaotic composition of the cemented gravel I may be taken as an indication of sheet flooding processes and highly turbulent flow conditions of the river. On the other hand, the cemented gravels II and III are better sorted and mature, and both might have been deposited as "point or channel bars of the Belan."[3] The gravel II is cross-bedded and thick (maximum thickness five metres). These suggest considerable depth of water column and uniform flow conditions in the river. The scientists did not notice significant change in the mineral composition of either the gravels or the silts. The entire section was formed during the late Pleistocene period.

The gravel I and II and the overlying red sands are fossilferous and have yielded a large number of mammalian remains. Satsangi and Dutta and then Dassarma and Biswas have identified several species—*Bos* sp., *Bubalus* sp., *Equs* sp.,

1. *Ibid.*, pp. 34-35
2. Mujumdar, G.G. and Rajguru, S.N., 'Investigations of the Pleistocene Sediments from the Belan Valley, U.P.', *Indian Antiquary*, Third series, Vol. IV, 1970, pp. 96-105.
3. *Ibid.*, p. 103.

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Elephas sp., *Cernus* sp., *Antilope* sp., *Trinovx*, sp., *Gavialis* sp., and *Gazella*.[1] However, "there is apparently no difference in the assemblages of fossils from the two units".[2] Relying upon the observations of Falconer, Pilgrim and Chakravorty, Dassarma has concluded that this faunal assemblage, comparable with that of the Yamuna and the Ganga, may be compared with the Upper Narmada group of de Terra. It was also suggested that "*Palaeoloxodon*, *Terraprotodon* and *Bos namadicus* characterised the Upper Glacial Pleistocene of India and survived as late as the Early Holocene."[3]

Dassarma and Biswas have also touched upon the problem of chronology of the various deposits of the Belan. They think that the 'boulder-clay unit' was formed during the last Pleistocene glacial climate, while the 'gravel-sand unit' belonged to the Late Glacial and Early Holocene climate. All the subsequent episodes are also said to be of the Holocene period. They have doubted the C^{14} date of the gravel III. Firstly, it is held that the fresh water shells do not form a reliable sample for dating, since they are commonly impregnated with lime. Secondly, they did not notice abundance of fresh water shells in the gravel III. They are inclined to take the above C^{14} date determination for the 'Gravel-sand unit' (*i.e.*, the gravel II).

Thus, two sets of interpretations have been suggested with reference to the various deposits of the Belan section. According to one, they represent climatic fluctuations of the Late Pleistocene in the form of glacial and warmer and humid phases. In the other hypothesis, the usual scheme of wet and dry phases has been suggested. Sharma has followed the line taken by most of the prehistorians of the sub-continent since long, and has generally associated the gravel deposits with the wet phases and the silts and clays with dry climates. Mujumdar and Rajguru also seem to support a similar scheme of climatic fluctuations, but they are conscious of the limitations of the evidence and hesitate to make any categorical statement in this regard.[4]

The scheme of glacial and mild climatic conditions prevailing in the Vindhyas during the Late Pleistocene times is worth some consideration. Dassarma and Biswas think that the gravel I is, at least partly, the result of the process of solifluction. It is well-known that this process is associated with very cold climatic conditions, in which the sub-soil is parmanently frozen (*Tjaele*).[5] It is generally regarded a feature of periglacial regions, and the process is still at work in the arctic and the

1. *op. cit.* p. 37.
2. *op. cit.*
3. Dassarma, D.C., 'Some Observations on the Quaternary Stratigraphy and Mammal Assemblages of India', *Colloquium on the Palaeontological Studies in Southern Region*, G.S.I., 1976, in Dassarma & Biswas, *op. cit.*
4. Mujumdar and Rajguru, *op. cit.*
5. Zeuner, F.E., *The Pleistocene Period*, pp. 26-27.

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alpine zones. According to Zeuner, "Solifluction produces huge masses of unstratified or indistinctly stratified debris at the foot of the hills and on the lower portion of the slopes."[1] But, we did not come across any such deposit anywhere else in the Belan region either on the slopes or at the foot of the numerous hills. The yellow silt overlying the gravel-sand unit has been regarded at least partly of loessic origin. The loess is again a well-known wind borne deposit of the dry climate, particularly of the peri-glacial regions, throughout the world. But it may be recalled that Mujumdar and Rajguru failed to find any positive evidence in support of any silt of the Belan being aeolian deposit.[2] On the other hand Dassarma and Biswas do not refer to any laboratory studies, which may hold conviction in support of the said deposit being loessic in origin. Further, we feel that one requires much more evidence to establish the existence of glacial climate in the past than is available. In Europe and North America, there is overwhelming evidence in support of such a climate in the form of moraines, solifluction-deposits, frost-soils, loesses and above all palaeobotanical, palynological and palaeontological remains. The first two gravels of the Belan have yielded a good amount of fossil-fauna. Does it also indicate existence of glacial climate during the Late Pleistocene times in the region ? In fact, none of the species found from any of the deposits can be classed under the typical tundra fauna. If Dassarma's suggestion regarding faunal evidence is to be accepted, the whole of the Peninsular India, as also Sri Lanka, where a similar group of fauna has been found in the Ratnapura phase,[3] must have been in the grip of glacial climate for a long part of the Late Pleistocene. Such a proposition is hardly tenable in view of the available evidence. However, it may be recalled that recently claims have been made by different investigators regarding some indications of the glacial climate during the Pleistocene in parts of Central India. Krishnaswamy and Hukku claimed to have found faceted, grooved and stariated gravels, cobbles, and boulders from an excavation in the Belan river. This has been regarded as an evidence of a freezing climate.[4] Similarly, the Bap Boulder Beds of Bap-Kolayat region of Western Rajasthan, said to be the result of glacial drift, have been attributed to the Quaternary by Mukhopadhyay and Ghosh.[5] These isolated examples surely point out to a possibility of the existence of tundra climate during some part of the Pleistocene in this area and thus open a new line of investigation. But, in the absence of adequate supporting evidence, the whole argument lacks conviction.

The cliff-section of the Belan contains all the essential features of the Pleis-

1. *Ibid.*
2. *op. cit.*
3. Deraniyagala, P.E.P., *The Pleistocene of Ceylon*, Colombo, 1958, pp. 32-33.
4. Krishnaswamy, V.S. and Hukku, B.M.R. 'Evidence for Pleistocene Glaciation in Parts of the Vindhyan Plateau in Mirzapur District, Uttar Pradesh', *Science & Culture*, Vol. 36, No, 4, 1970, pp. 242-43.
5. Referred to by Sinha, Subrata, 'Geology and Environments of the Quaternary in Rajasthan' the paper presented at the annual conference of the *Society for Prehistoric and Quaternary Studies in India*, held at Jaipur in December, 1976.

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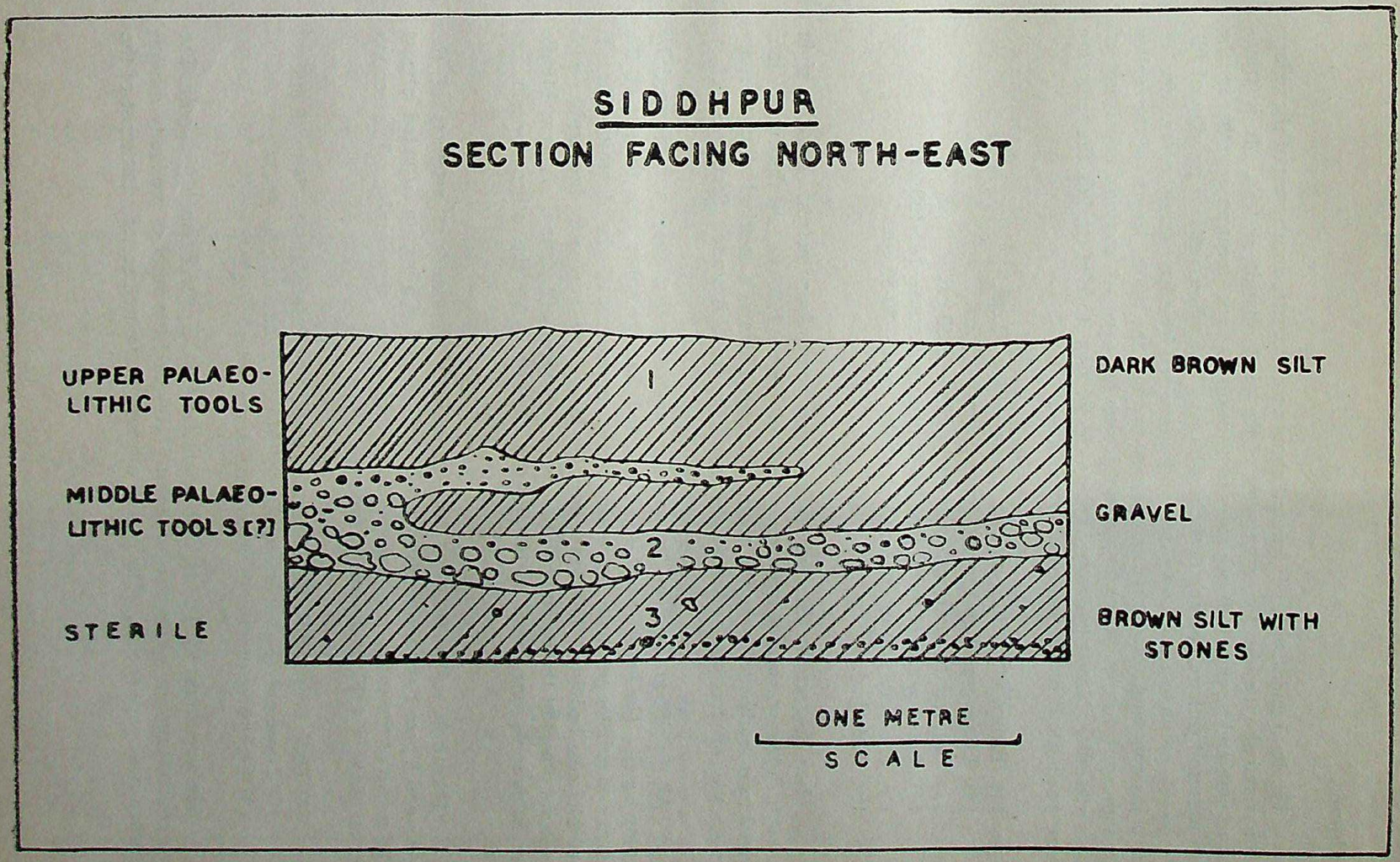
tocene stratigraphy noticed in other parts of Peninsular India. In all the river valleys, there are gravel deposits intervened by silt or clay deposits. Almost everywhere the gravel I underwent severe erosion, as a result of which it is rarely found *in situ*. Similarly, cross-bedding is almost a regular feature of the gravel II throughout the Peninsula. Under the circumstances, it may not be advisable to interpret the Belan section in isolation.[1] As long as no other definitive evidence is brought to light, the scheme of wet and dry phases holds good for our region also. Yet, it may not be easy to associate precisely the various deposits with definite climatic phases. Taking clues from the sediment analysis carried out by Mujumdar and Rajguru,[2] the following may be suggested : Since the boulders and cobbles of the gravel I retain their angularity a great deal, and perfect rounded specimens are extremely rare, it may be suggested that the deposit was made under comparatively dry conditions, when the river was incapable of transporting the material over long distance. The overlying mottled clay resembles to some extent the lacustrine deposits. The still water conditions may be the result of wet climate, which was also probably responsible for eroding a large portion of gravel I. The gravel II is fairly well sorted and also partly cross-bedded (Pl. IIB & III). The pebbles are better rounded, indicating long transportation. This may mean that the river still contained enough water and the flow was constant, even though the climate might not have been as wet as in the preceding phase. The aridity probably increased gradually and when it reached the maximum the yellow sandy silt (hill-wash according to Sharma and partly aeolian according to Dassarma and Biswas) was formed.[3] It is probably during this phase of extreme aridity that most of the rock-shelters of the adjoining regions were formed due to severe physical weathering. The gravel III may represent a gradual change from dry to wet, as suggested by Sharma. It is neither the B-horizon of the overlying deposits, nor a caliche, as postulated by Dassarma and Biswas. It's real character can be noticed better in the Seoti, where it is loose fine gravel, sometimes intervened by bands of sand. For the overlying deposits we are inclined to agree with the interpretation of Sharma.

1. Rajguru and Hegde also think that the problems associated with the Belan and other streams of the region are similar to those of the Peninsular rivers. Rajguru, S.N. and Hegde, K.T.M., 'The Pleistocene Stratigraphy of India', *Archaeological Congress and Seminar Papers*, (ed.) S.B. Deo, Nagpur, 1972, p, 71.
2. *op. cit.*
3. Shri S.C. Singh Rana, Soil chemist of the department of Geography, Banaras Hindu University, carried out some preliminary analysis of a sample of this deposit. The details are as follows :

   Acid reaction—Vigorous
   pH —10.5 (very strongly alkaline)
   Grains : Sand—42%
   Silt —36%
   Clay—22%

   The high pH value is indicative of the salinity of the deposit and poor drainage. Butzer says, 'Loess-lile deposits that fit the structural but not the textural definition should be excluded from the concept of loess", *op. cit.*, p. 200.



Section 4

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Siddhpur

The Bankesiddh valley is located about one kilometre south-west of the village Siddhpur and about eight km. south-east of Karwi in Banda district. It is triangular in plan and bounded on two sides by two hill ranges, meeting together in the south-west and with an opening in the north-east. The whole valley is an alluvial fill, and presents an undulating landscape. It is traversed by a few small *nalas*, one of them being comparatively bigger and flowing through the whole length of the valley in its sinuous *thal-weg*. At some places this *nala* has exposed sections consisting of gravels and silts. Nearly half way, close to the western slope of the hill, the following section was noticed on the left bank of the *nala* :

(1) Brown silt, rich in organic matter—40 to 50 cm.
(2) Loose gravel and sand (Upper gravel)—55 cm.
(3) Silt, rich in sand particles (sandy silt)—75-80 cm.
(4) Loose gravel (Lower gravel)—implementiferous—145-150 cm.
(5) Silt, very rich in sand particles (silty sand)—80-85 cm.
(6) *Nala* bed.

The whole section (Section 5A) measures nearly four metres. On the right hand side, however, there is only one gravel of about 139. cm. in thickness. It is covered by a sandy silt measuring about 170 cm. There is a marked disconformity between the two deposits, and a big portion of the gravel is eroded (Section 5 B).

All the silts are poor in clay particles, suggesting that they were formed by running water. The lower gravel is better sorted than the upper one, the size of the pebbles and cobbles gradually decreasing in the upper part of the deposit. There is no visible cross-bedding. This lower gravel is loose, but compares favourable with the second gravel of the Belan from the point of view of sorting. A few Middle Palaeolithic tools were found *in situ* in this deposit. All the other deposits are sterile.

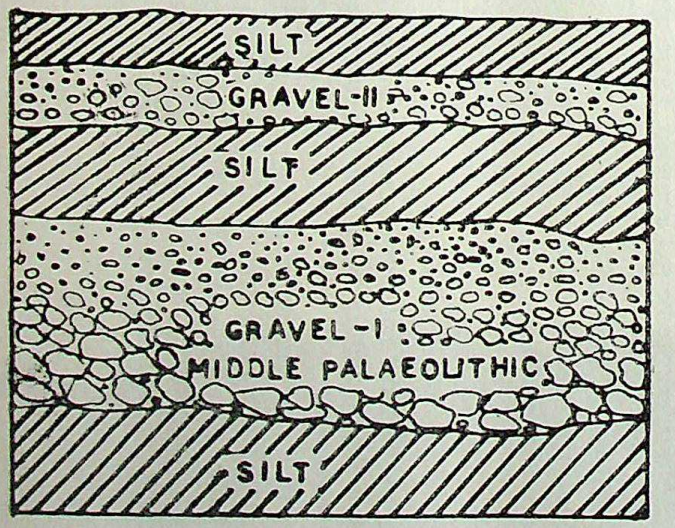
The whole valley (Pl. VA) is littered with thousands of artefacts of the Middle and Upper Palaeolithic phases. A small mound of alluvium, situated almost in the centre of the valley, was selected for probing the stratigraphy. The section revealed (Section 4, Pl. V B) was as follows :

(1) Dark brown silt—implementiferous (Upper Palaeolithic)—54 to 76 cm.
(2) Loose gravel—implementiferous (Middle Palaeolithic?)—16-34 cm.
(3) Light brown silt with occasional stones—sterile—32-48 cm.

The uppermost silt has yielded artefacts of the Upper Palaeolithic phase. The major concentration is within the first twenty cm., and the number gradually diminishes when one goes deeper. The gravel appears to be well sorted, but most of the

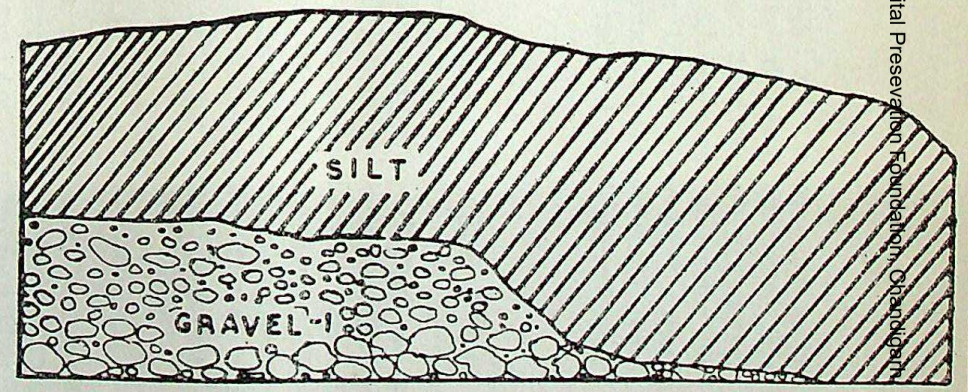
SIDDHPUR VALLEY

SECTION FACING NORTH-WEST



NALA BED

SECTION FACING EAST



NALA BED

ONE METRE

SCALE

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sandstone pebbles are not well rounded. The lowermost deposit is sterile. After the deposition of the gravel, it appears, the whole valley passed through an erosional phase. This was also indicated by the right bank section of the *nala*. The dark brown colour of the upper silt, containing more clay than sand particles, seems to be the result of *in situ* weathering. The gravel yielded a few chipped nodules of crypto-crystalline silica. It is not certain whether these artefacts may be associated with the Middle Palaeolithic phase. The site deserves further probing.

Durendi

The village Durendi is situated at a distance of about five kilometres south-west of Banda town on the bank of the river Ken. The river has spread gravels and sands all over its bed. However, a section was noticed on the left bank of the river consisting of loose gravel with sand, also cemented in patches, measuring 1.5 to 2 metres, and a very thick silt deposit of 12-15 metres thickness, lying over it. Two Middle Palaeolithic implements of crypto-crystalline silica were found *in situ* in the gravel. It contains medium to small sized, mostly well rounded, pebbles of crypto-crystalline and crystalline silica, as well as sandstone and quartzite. Calcium carbonate appears in patches. The upper silt is also rich in calcium carbonate.

Chaura-Bijaura

The twin villages of Chaura and Bijaura are situated on the right bank of the river Son, almost 8 kilometres west of Chopan in Mirzapur district. A section was found on the right bank of the Son, near Chaura, in which the lower part is 2 to 3 metres thick consolidated gravel, overlain by a silt deposit measuring 2.5 to 3 metres in thickness. The gravel has yielded a few Middle Palaeolithic tools. Most of the pebbles appear to be well rounded. There was no evidence of cross-bedding at Chaura, but, only 1.5 km. up-stream at Bijaura, the cemented gravel was replaced by a huge deposit of alternating gravel and sand layers, sometimes also distinctly cross-bedded (Section 6). The section on the right bank of the Son at Chopan also yielded similar evidence.

Lahchura

The site is located around Lahchura dam on the river Dhasan, nearly eighty-five kilometres east of Jhansi and seven kilometres north-west of Harpalpur. The nearest village is Lahchuraghat in Jhansi district, little more than a kilometre north of the dam. This extensive site falls partly in Hamirpur and Jhansi districts of Uttar Pradesh, and partly in Chhatarpur district of Madhya Pradesh. The river has exposed a section on its left bank near the dam (Pl. VI). The section contains a gravel deposit, 50-80 cms. thick, lying directly on the weathered and undulating surface of the granite rock. The pebbles of quartzite, granite, crystalline and crypto-crystalline silica

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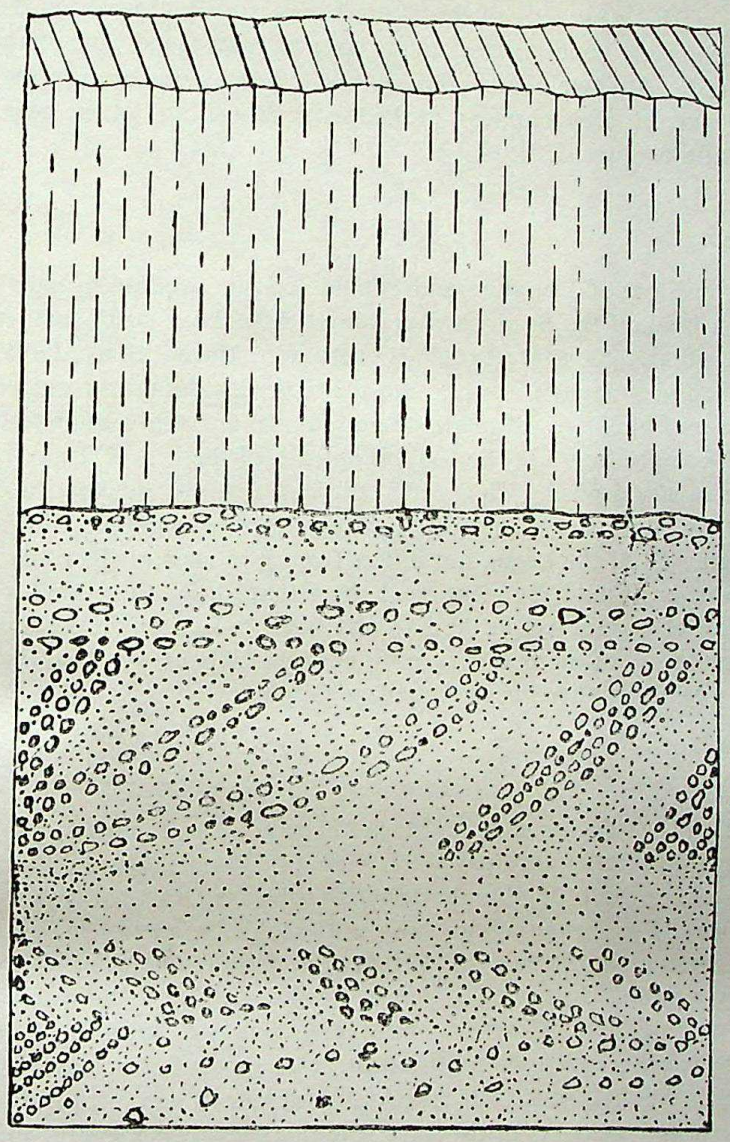
SECTION ON THE SON AT BIJAURA, MIRZAPUR DISTRICT



SECTION 6

are generally rounded in this deposit. A few pebble tools were also found *in situ*, along with one Levallois flake of cherty-quartz. While the latter is sufficiently rolled and patinated, the pebble tools are almost in mint condition. This indicates long transportation of the Levallois flake. It appears that the pebble tools found in abundance on the nearby slopes of the hills got mixed with the gravel during the process

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of its formation. It may be inferred that chronologically the chopper-chopping tool industry of Lahchura belonged to an earlier phase than this gravel of the Dhasan. Subsequent to the deposition of the gravel, the region must have experienced a period of heavy erosion. Consequently a big part of this gravel was eroded. Overlying the undulating surface of the gravel deposit is a thick layer of silty sand (maximum thickness nearly two metres). At some points the section contains one or even two additional thin layers of gravels, which appear to be the redeposition of the basal gravel, with slight admixture of slope detritus.

Nihi

A small section consisting of a boulder and cobble deposit overlain by sandy silt was noticed on the left bank of the Bardaha river, about three km. north-east of the village Nihi. The site, situated on a forest road, is nearly nine km. south of Manikpur in Banda district. The lower deposit, nearly one metre thick, contains rounded and sub-rounded cobbles and boulders of quartzite and sandstone. While numerous tools of Acheulian complex were found in the cobble spread of the bed, a few were also recovered from the *in situ* deposit. The sandy silt is of uneven thickness and nowhere measures more than 1.5 metres. The size of the boulders and cobbles shows some similarity with the gravel I of the Belan, but differs from it in view of the roundness of the material. However, it may be mentioned here that only three km. upstream, there is a steep fall of several feet in the Bardaha river, which might perhaps be responsible for the roundness of the boulders and cobbles. About six km. upstream, a similar section was also noticed near the village Gopipur.

Lahariadih

A rock shelter (Pl. VIIA), facing east, on Mura hill, nearly two km. east of the village Lahariadih in Mirzapur district, was partly excavated by the author in April 1977. It is about sixty-five km. south of Mirzapur and is visible, at least partly, from the Mirzapur-Rewa highway. The shelter is fairly large, although a big part of the overhanging rock fell down sometime in the past (Pl. VII A). The deposit noticed inside the shelter is most probably very thin. Just outside the shelter the deposit forms a slope. Two small trenches, measuring 2×1.5 metres, were laid, one just in front of the shelter on the slope, and the other towards south on the level ground near the fallen rock. In the second trench the bed-rock was struck after about 40 cm. of digging. But the deposit was comparatively thicker in the slope, the thickness being 95-105 cm. The underground sandstone rock also forms a slope on which lies the brownish-black earth deposit of almost uniform thickness (Pl. VII B). It is divided into three on the grounds of the cultural material yielded. It may be emphasised that the whole deposit is so uniform in colour and texture that no stratification is possible on the basis of soil types. Sandstone splinters, both big and small, were found throughout this deposit. However, there is a greater concentration of stones near the bottom.

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The lowermost 20 cm. yielded an Upper Palaeolithic industry, described in the Chapter V. In the next 20-25 cm. was found a bladelet industry, devoid of pottery, but having some small beautifully made triangles. The lithic industry, almost similar to the previous one, was found associated with red pottery of coarse fabric, partly hand made, in the uppermost layer. The whole deposit appears to be aeolian in nature with very little sand content. It is sticky when wet. The entire deposit looks like humus, rich in organic matter, which is probably responsible for the dark colour of the earth. Preliminary laboratory test confirms this suggestion, and also indicates that the soil is not acidic.[1] It may be suggested that the whole deposit was formed during a dry phase of considerable duration, followed by a humid phase when the whole area was covered by thick vegetation. The above suggestion is tentative, based purely upon preliminary examination. A large scale excavation on this and a few other neighbouring rock-shelters, coupled with detailed laboratory tests, are essential for a firm stratigraphy. The work in this direction is proposed during the coming years.

DISCUSSION & RESUME

Among all the localities where some evidence for Quaternary stratigraphy has been found, it is the Belan cliff-section, with its extension in the Seoti, which distinguishes itself by exposing an almost complete sequence of deposits of the late Pleistocene.[2] At all the other places the deposits represent only two or more phases. As mentioned earlier, most probably the gravels and intervening silts or clays indicate a cycle of dry and wet phases. But, in view of the recent hypothesis of the existence of glacial and mild climates during the late Pleistocene period in this part of central India, and also of the inadequacy of the data on palaeo-environment, the above suggestion should not be regarded anything more than an unproved hypothesis. Although each river-section should be studied separately with reference to the geological, physiographical and ecological factors of various regions, it is yet uncertain whether the gravels noticed in many river banks of the Peninsula represent wet or dry phase.[3] In this respect, it is worthwhile to recall the warning issued by Rajguru to all

1. The test was conducted by late Shri K.D. Mishra of our department.
2. Many scientists have suggested on various grounds that both first and second aggradational deposits of the Peninsular rivers should be placed in the Late Pleistoceen Period. For example, see Rajguru, S.N., 'Some New Fossil Discoveries from Western Maharashtra, India', *Puratattva*, No. 2, 1968-69, pp. 16-20, and Wainwright, G.J., *The Pleistocene Deposits of the Lower Narmada River*, Baroda, 1964.
3. The scientists do not seem to agree on this issue. Zeuner writes : "A river in the region with a dry, arid or semi-arid climate flows through a country which is mostly barren, the rocks being exposed to physical weathering. Plenty of rock-waste often of a coarse grade, is delivered to the rivers...The load is carried chiefly in periods of floods and thrown down when they subside. Such rivers build up their beds by adding sheet after sheet of gravels...", Zeuner, F.E., *The Pleistocene Period*, p. 47. On the other hand, Butzer thinks that such deposits indicate great stream competence during a period of increased precipitation, Butzer, K.W., *Environment and Archaeology*, pp. 182-83.

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the field workers that they should refrain from drawing any firm conclusions regarding palaeo-environment, purely on the basis of silts and gravels of the river sections.[1] The palaeontological data, yielded by various sections, including that of the Belan, hardly provide any conclusive evidence in this respect. Now our hope lies mainly on the sediment analysis of the various river deposits, and excavations of the habitational areas of the prehistoric man.

Like the problem of palaeo-environments, the question of chronology also remains unsolved. While the river-sections provide reliable evidence for relative chronology, the absolute dates of the industries coming from different deposits are yet to be established. The exception is formed by two C^{14} determinations of the gravel III of the Belan, and a few dates of the gravel II of Maharashtra. It is yet to be determined whether the Acheulian industries coming from the first aggradational deposits of the rivers of the Peninsula, including those of our region, belong to the Middle Pleistocene or early part of the Upper Pleistocene. Rajguru has argued at great length, on the basis of fossil evidence, that both the first and the second aggradational deposits should be assigned to the Upper Pleistocene.[2] Dassarma and Biswas have also suggested a similar possibility, though on different grounds.[3] Yet the whole hypothesis lacks the support of reliable and adequate evidence. It is to be hoped that in the near future the problems of palaeo-environment and absolute chronology will be solved with the help of more laboratory work and different physical methods of dating.

1. He made a statement to this effect in the seminar on Indian Prehistory, held at the Deccan College, Poona, in June 1974.
2. *op. cit.*, 1968-69.
3. *op. cit.*

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CHAPTER III

The Lower Palaeolithic

De Terra and Paterson regarded the northern rim of the Indian land mass "important for the geologist and prehistorian alike".[1] The area also includes Southern Uttar Pradesh, where Cockburn had already found a Lower Palaeolithic industry in stratified deposits.[2] The investigations carried out by the Yale Cambridge expedition indicated that there were two Lower Palaeolithic cultures in the Indian sub-continent. The Soan culture, characterised by choppers and chopping-tools, was a culture of the north-west, and the other a Handaxe culture-complex widely distributed in the Peninsula. When Krishnaswami and Soundara Rajan explored the Singrauli basin under the leadership of Zeuner and saw pebble-tool element mixed with handaxe complex there, they unhesitatingly declared it a 'meeting ground' of the two Lower Palaeolithic cultures of the sub-continent.[3] Evidently, they were influenced by the views of de Terra and Paterson, with whom the former participated in the Yale Cambridge expedition.

Our own investigation reveals the existence of two different typological groups in the Lower Palaeolithic industries of Southern Uttar Pradesh. They are the pebble-tool complex and Acheulian industries. Many industries of the latter category exhibit features of both the traditions. It needs to be emphasised here that this grouping is solely based upon techno-typological considerations. We propose to describe the industries of the two groups in the following pages with a view to emphasising their techno-typological features.

A—PEBBLE-TOOL COMPLEX

As the name suggests, the industries of this group are characterised by the occurrence of various types of pebble-tools and associated flakes, and the total absence

1. De Terra, H. & Paterson, T.T., *Studies on the Ice Age in India and Associated Human Cultures*, Washington, 1939, p. 313.
2. Cockburn, J., *op. cit.*, 1888.
3. Krishnaswami, V.D. & Soundara Rajan, K.V., 'The Lithic Tool Industries of Singrauli Basin', *Ancient India*, No. 7., pp. 40-65.

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of handaxe-cleaver element. The Yale Cambridge expedition found a large number of pebble-tool industries in the Potwar region of Pakistan, which constituted the Soan Culture.[1] Subsequent workers traced its extension to Himachal Pradesh in India[2] (Previously most of these sites were in East Punjab, but, after the reorganisation of states, all are now located in Himachal Pradesh.). In the early sixties of this century, Khatri[3] claimed to have located a pebble-tool industry at Mahadeo-Piparia in the earliest stratum of the Narmada. He named it Mahadevian. This was the first indication of a pebble-tool site in Central India, so far away from the Potwar and Himachal Pradesh. But, further work in the area by Supekar proved most of Khatri's observations incorrect.[4] Then on January 1, 1964, we located a true pebble-tool industry near Lahchura dam, situated on the border of Jhansi and Hamirpur districts of Uttar Pradesh, and Chhatarpur district of Madhya Pradesh, on the banks of the Dhasan.[5] After a decade, in 1974-75, two more similar industries were found along the rivers Ken and Betwa during our exploration in Banda, Hamirpur and Jhansi districts.

These investigations thus prove beyond doubt the independent existence of pebble-tool industries in this part of the sub-continent. So far only three sites, *viz.*, Lahchura on the Dhasan, Bangawan on the Betwa, and Belharka on the Ken, have been located, which have yielded pebble choppers and chopping-tools. Further work may bring to light many other similar industries. At all the three sites, artefacts were found on the surface, without any stratigraphical context. It is heartening to note that the pebble-tools appear in the earliest cultural stratum at Bhimbetka.[6] It is at this site that the stratigraphical position of these industries *vis-a-vis* Acheulian is fairly well established. Looking at the geographical situation of Bhimbetka and that of the sites of Southern Uttar Pradesh, it will not be unreasonable to borrow the relative chronology of the various palaeolithic industries from the former for the benefit of the latter. Hence the pebble-tools of our region may be tentatively regarded as representing the earliest human activities.

Of all the three sites, Lahchura is the richest and the most extensive, while Belharka has yielded only a small number of tools. At the former and at Bangawan, all the artefacts, barring a few, were found on the lower slope and foot of the nearby

1. De Terra & Paterson, *op. cit.*
2. Sen, D., 'Nalgarh Palaeolithic Culture', *Man in India*, Vol. 35, 1955, pp. 177-184; Lal, B B., 'Palaeoliths from the Beas and Banganga Valley', *Ancient India*, No. 12, 1956, pp. 58-92; Sharma, Y.D., *IAR.*, 1955-56, p. 58; Mohapatra, G.C., 'A Preliminary Report of the Exploration and Excavation on Stone Age Sites in Eastern Punjab,' *Bull. Deccan College Res. Inst.*, 1966, pp. 221-237.
3. Khatri, A.P., 'Mahadevian : An Oldowan Pebble Culture in India', *Asian Perspectives*, Vol. VI, 1963, p. 186 ff.
4. Cited by Sankalia, H.D., *Prehistory and Protohistory of India and Pakistan*, pp. 118-119.
5. Briefly described earlier by Pant, P.C., 'Comments on 'Is Soan a separate Culture', in *Indian Prehistory-1964*, (ed.) Misra & Mate, pp. 8-9.
6. Wakankar, V.S., 'Bhimbetka—The Prehistoric Paradise', *Prachya Pratibha*, Vol. III, No. 2, p. 14 ff.

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hills. It appears that the man responsible for manufacturing the pebble-tools preferred foot-hills as habitat, and also the vicinity of the perennial rivers, which helped him in acquiring food, drink and raw material for implements. It may be noted that no pebble-tool industry has so far been located away from the big rivers in this region. Could it be that the man chose to move around this area, along these perennial rivers only ? It is, of course, too early to arrive at a definite conclusion, and only further investigation may prove or disprove this suggestion.

Lahchura

Situated near the tri-junction of Hamirpur and Jhansi districts of Uttar Pradesh, and Chhatarpur district of Madhya Pradesh, the site of Lahchura is indeed very extensive, covering an area of about two square kilometres. The actual site is around the Lahchura dam, constructed on the river Dhasan, a tributary of the Betwa. The nearest village is Lahchuraghat (Lat. 29°19/N, Long. 79°18/E) in Jhansi district, a little more than a kilometre north of the dam. The site can be approached by bus from Harpalpur (on Jhansi-Manikpur Railway line), which is nearly seven km.

The site, the dam, and the lake behind it are contained between two granite hills, running roughly NNE-SSW. The hill lying west of the Dhasan runs almost parallel to the river for more than two kilometres. The tools are mostly found on the feet and slopes of both the hills along the river, which has also exposed a small section on the western bank, described in detail in chapter II.[1] The tools occur in the gravel, lying directly on the eroded surface of the granite bedrock, but in a very limited number. Besides, they are almost in mint condition, as found on the foot of the nearby hills. A few smaller flakes of fine grained stones of quartz group, including one true Levallois flake, were also found in the gravel, comparable in composition with the gravel II of the Belan. These artefacts are heavily patinated. Looking at all these factors, we find it difficult to associate the pebble-tools with this gravel deposit.

The industries found at Lahchura may be classified into two groups on techno-typological grounds. The industry, located on the foot and slope of the hill lying east of the Lahchura dam in district Chhatarpur of Madhya Pradesh, that found along the eastern bank of the river about one km. north of the dam in Hamirpur district of Uttar Pradesh, and that discovered on the eastern foot and slope of the hill running west of the Dhasan river almost parallel to it, form the first group. Since all of them exhibit common techno-typological features, they are being treated as single industry. All the three are characterised by the occurrence of a large number of choppers and chopping-tools and a small proportion of flakes, including very few flake tools. Levallois cores and flakes and also a few discoidal cores do appear, but in a negligible number. There is only one industry in the second group, found at the western foot of the long hill, running west of the Dhasan. The site was located nearly 500 m.

1. *Infra*, pp. 33-34.

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south of the Lahchuraghat village in Jhansi district during our second visit in 1974-75. Pebble choppers and chopping-tools, almost similar to those found in the industries of the group I, from a characteristic feature of this industry also. But, they are far out-numbered by various flakes and a variety of flake tools. Besides, there is a definite increase in the Levallois cores and blanks, and blade-bladelet cores and their products. Considering these techno-typological characteristics, this industry seems to represent a stage of subsequent development within the pebble-tool complex of this region, although stratigraphical confirmation to this effect is still wanting. It may be tentatively assigned to the Middle Palaeolithic, and will be discussed in detail in the subsequent chapter.[1] The artefacts of gronp I fall under the following broad categories:

TABLE 1

Artefact-type	Nos.	%
Finished tool	225	65.2
Partially retouched flake	10	2.9
Flake	57	16.5
Core	35	10.0
Split pebble	13	3.7
Chip	5	1.4
Total	345	99.7

The classification of artefacts (Figs. I-V), as indicated by the above table, clearly reveals the factory site character of Lahchura. But the large number of finished tools, constituting 65.2% of the total, also points to its being a settlement area of the prehistoric man. It needs to be emphasised that all the artefacts of the industry have been fashioned out of pebbles, mostly of medium grained light purple quartzite, though in rare cases pebbles of granite, opal (cherty), jasper, quartz, dolerite and basalt have also been used. Most of the split pebbles are artificial, but a few may be natural as well.

It is evident from the table 2 (p. 41) that various choppers, including the single stroke ones, constitute the largest single group, forming as much as 84.4% of the total number of finished tools. Among the choppers, the one with convex edge occupies the most dominant position, forming 53.3% of the total number of finished tools and 63.2% of all the choppers. It may be regarded as a characteristic tool-type of the industry. The single stroke chopper may or may not be a finished tool. It may be taken as an unfinished pebble-tool, which was discarded for some reason after an initial attempt. But, it appears in good number, and some of the specimens show long working edges. These factors have led for their inclusion in the finished tool group.

1. *Supra*, p. 102 ff.

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Retouch of any type is limited to four side-scrapers only, and does not seem to constitute an important feature of the industry.

The table given below enumerates the precise types represented by various finished tools :

TABLE 2

S.No. Tool-type	Nos.	%
1. Chopper with convex edge	120	53.3
2. Chopper with concave edge	4	1.8
3. Chopper with pointed edge	17	7.6
4. Chopper with straight edge	31	13.7
5. Chopper with concavo-convex edge	4	1.8
6. Single stroke chopper	14	6.2
Total of Choppers	190	84.4
7. Chopping-tool with convex edge	10	4.4
8. Chopping-tool with concave edge	1	0.4
9. Chopping-tool with pointed edge	3	1.3
10. Chopping-tool with straight edge	6	2.6
11. Chopping-tool with wavy edge	11	4.9
Total of Chopping-tools	31	13.6
12. Side scraper on flake	2	0.8
13. Side scraper on split pebble	2	0.8
Grand Total	225	99.6

Since the choppers form the most dominant tool-group, they deserve a somewhat detailed treatment. They are made on flat based, round based and split pebbles, their exact position being as follows :

TABLE 3

Type	Flat based	Round based	Split pebble	Total
Convex chopper	46	72	2	120
Concave chopper	3	1	—	4
Pointed chopper	9	7	1	17
Straight chopper	21	10	—	31
Concavo-convex chopper	1	3	—	4
Single stroke chopper	4	10	—	14
Grand Total	84	103	3	190

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It is clear from the above table that, unlike the Guler industry,[1] there is no particular preference for the flat based pebbles for manufacturing choppers. In fact, the choppers made on round based pebbles outnumber the other two. Similarly, the Lahchura industry distinguishes itself from the Early Soan[2] also, for having a negligible number of choppers made on split pebbles.

The working on the choppers, as also on chopping-tools, is essentially crude. The angle is not uniform. From this point of view, the choppers may be grouped under the following three broad categories—category I—below 70°; category II—70° to 80°; and category III—above 80°.

TABLE 4

Type	Below 70°	70°—80°	Above 80°	Total
Flat based Chopper				
1. Convex	10	15	21	46
2. Concave	1	—	2	3
3. Straight	5	5	11	21
4. Pointed	4	2	3	9
5. Concavo-convex	—	—	1	1
Total	20	22	38	80
Round based Chopper				
6. Convex	18	29	39	86
7. Concave	—	—	1	1
8. Pointed	1	2	4	7
9. Straight	3	1	6	10
10. Concavo-convex	1	—	2	3
Total	23	32	52	107
Chopper on Split Pebble				
11. Convex	1	1	—	2
12. Pointed	1	—	—	1
Total	2	1	—	3
Grand Total	45	55	90	190

Most of the choppers thus fall under the category III, yet the working of category I and II is also found in a large number of specimens.

1. Lal, B.B., *op. cit.*, p. 65.
2. De Terra & Paterson, *op. cit.*

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The following table gives the length-breadth measurement ranges of the various artefacts.

TABLE 5

LENGTH

Size Range (in mm.)	CHOPPER %	SPLIT PEBBLE %	CHOPPING TOOL %	FLAKE %	CORE %
40-49	1.5	—	—	—	—
50-59	3.0	25.0	33.3	—	—
60-69	10.9	—	—	—	50.0
70--79	17.3	—	—	100.0	—
80-89	13.9	—	—	—	50.0
90-99	15.8	—	—	—	—
100-109	18.8	—	33.3	—	—
110-119	3.4	75.0	—	—	—
120-129	12.4	—	33.3	—	--
130-139	3.0	—	—	—	—
Total	100.0	100.0	99.9	100.0	100.0

WIDTH

Size Range (in mm.)	CHOPPER %	SPLIT PEBBLE %	CHOPPING TOOL %	FLAKE %	CORE %
50-59	3.5	—	—	—	25.0
60-69	7.4	—	—	—	25.0
70-79	18.8	—	33.3	100.0	25.0
80-89	19.7	50.0	33.3	—	25.0
90-99	18.8	25.0	33.3	—	—
100-109	22.5	25.0	—	—	—
110-119	5.9	—	—	—	—
120-129	3.4	—	—	—	—
Total	100.0	100.0	99.9	100.0	100.0

For determining their size, the pebble-tools are oriented in a particular manner. The working edge is always kept upwards and the measurement from this end to the butt, lying just opposite it, has been regarded as the length of the tool. On the other hand, the maximum distance from one side to the other has been treated as its width. As per above table, most of the choppers fall in the length range of 60-109 mm. Surprisingly, the width range of most of these specimens is also from 70 to 109 mm.

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That means, a majority of the pebbles, selected for manufacturing choppers, is roughly square or circular, with very little difference between their length and width.

There is a fairly good number of flakes and cores in the industry, which throw ample light on the blank-detaching techniques employed. The following tables record their exact position.

TABLE 6

Flake-type	Nos.	%
1. Unprepared	16	23.1
2. Partially prepared	25	36.2
3. Prepared non-Levallois	27	39.1
4. Levallois	1	1.4
Total	69	99.8

TABLE 7

Core-type	Nos.	%
1. Unprepared pebble core	6	17.1
2. Partially prepared core	11	31.4
3. Prepared non-Levallois core	3	8.5
4. Levallois core	8	22.8
5. Blade/bladelet core	3	8.5
6. Irregular	4	11.4
Total	35	99.7

It is surprising that there are only sixty-nine flakes as against thirty-five cores. Normally, the number of flakes should have been more. Again, the technological picture emerging from the flakes is different, to a great extent, from that which the cores reflect. While there is a good number of Levallois cores in the industry, the corresponding flakes are in negligible proportion. On the other hand, the number of prepared non-Levallois cores is too small for twenty-seven flakes of this type. It is quite likely that some of these flakes were actually the second and third flakes from the Levallois cores, which were not prepared again after detaching the first flake. There are two seemingly blade cores, which contain one prepared central ridge each. But, the industry contains no blade. One bladelet core of cherty quartz might have been dropped at the site at some later date.

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Bangawan

Like Lahchura, the site of Bangawan also falls on the border of Uttar Pradesh and Madhya Pradesh. The village is in Madhya Pradesh, only half a kilometre south of the metalled road, joining Jhansi with Harpalpur. The place is nearly fourteen kilometres east of Jhansi. The tools are found on both sides of the road on the right bank of the Betwa river, to the east of which lies a small hill range falling in Madhya Pradesh. Some artefacts were also picked up from the foot of this hill. Thus, the topography of the site has great resemblance with that of Lahchura.

The number of artefacts from Bangawan (Figs. VI-VIII) is much less than those found at Lahchura. But typo-technologically, both the industries are strikingly similar. All the artefacts are made on quartzite pebbles or flakes struck from them at this site also. They fall under the following categories.

TABLE 8

Artefact type	Nos.	%
Chopper		
1. Concave	3	4.3
2. Straight	8	11.5
3. Convex	18	26.0
4. Pointed	1	1.4
5. Single stroke	8	11.5
Total of Choppers	38	54.7
Chopping-tool		
6. Straight	1	1.4
7. Concave	1	1.4
8. Convex	5	7.2
9. Pointed	2	2.9
Total of Chopping-tools	9	12.9
Others		
10. Split pebble	2	2.9
11. Partially retouched flake	2	2.9
12. Flake	11	15.9
13. Blade	1	1.4
14. Core	6	8.6
Grand Total	69	99.3

Similar to Lahchura, choppers outnumber chopping-tools in the Bangawan industry also. Among the choppers, the convex variety once more comes up as a

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predominant tool-type. Both the split pebbles do not bear any mark of further working. The choppers are made on flat and round-based pebbles, as shown in the table given below :

TABLE 9

Chopper-type	Flat-based	Round-based	Total
1. Concave	3	—	3
2. Straight	3	5	8
3. Convex	9	9	18
4. Pointed	1	—	1
Total	16	14	30

From the point of view of technique, the industry does not exhibit many advanced traits, although there is one blade, struck from an unprepared core, and one blade core, with a clear indication of the preparation of a ridge. The Levallois element is conspicuous by its absenee. The classification of blanks and cores, based on the techniques involved, is given below :

TABLE 10

Blank-type	Nos.	%
1. Unprepared flake	6	42.8
2. Unprepared blade	1	7.2
3. Partially prepared flake	6	42.8
4. Prepared non-Levallois flake	1	7.2
Total	14	100.0
Core-type		
1. Unprepared flake-core	2	33.3
2. Partially prepared flake-core	3	50.0
3. Blade-core with prepared ridge	1	16.6
Total	6	99.9

The working on pebble-tools is similar to that found on those of Lahchura. The choppers fall under all the three categories of angle of working, the exact position being as follows :

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TABLE 11

Chopper-type	Below 70°	70°-80°	Above 80°	Total
Flat-based				
1. Concave	2	1	—	3
2. Convex	1	4	4	9
3. Straight	—	—	3	3
4. Pointed	—	—	1	1
Total	3	5	8	16
Round-based				
5. Straight	—	1	4	5
6. Convex	3	2	4	9
Total	3	3	8	14
Grand Total	6	8	16	30
Ratio	1 :	1.3 :	2.6 :	5

Almost prependicular working appears to be a distinct feature of this industry also.

Belharka

Belharka is a small village situated on the right bank of the river Ken in Naraini *tahsil*, district Banda. It is nearly twenty five km. south-west of Naraini and six km. west of Kartal. The river has spread vast gravel and sand sheets on its bed. But, no pebble-tool occurs in this gravel spread. They are found instead near the right bank, close to the village. There are only five specimens, among them, four are choppers and one chopping-tool. Three of the choppers are convex and one roughly straight (Fig. IX). In spite of an insignificant number of specimens from the site, it is important to note, Belharka is the only place on the river Ken, which has yielded a definite evidence for pebble-tools so far. Mention may also be made of the fact that, like Lahchura, four of the five specimens measure in length from 80 to 103 mm. Besides, the angle of working is also in agreement, two of the choppers falling in the category II (70°-80°), and the remaining two in the category III (above 80°).

Besides the above, one flake-cleaver and a few flakes including a Levallois one (Fig. IX) were also picked up from the loose gravel spread of the Ken.

Resume of Pebble-tool Complex

Though there are only three sites in the region under discussion which have yielded pebble-tool industries, yet they are enough to establish the separate existence

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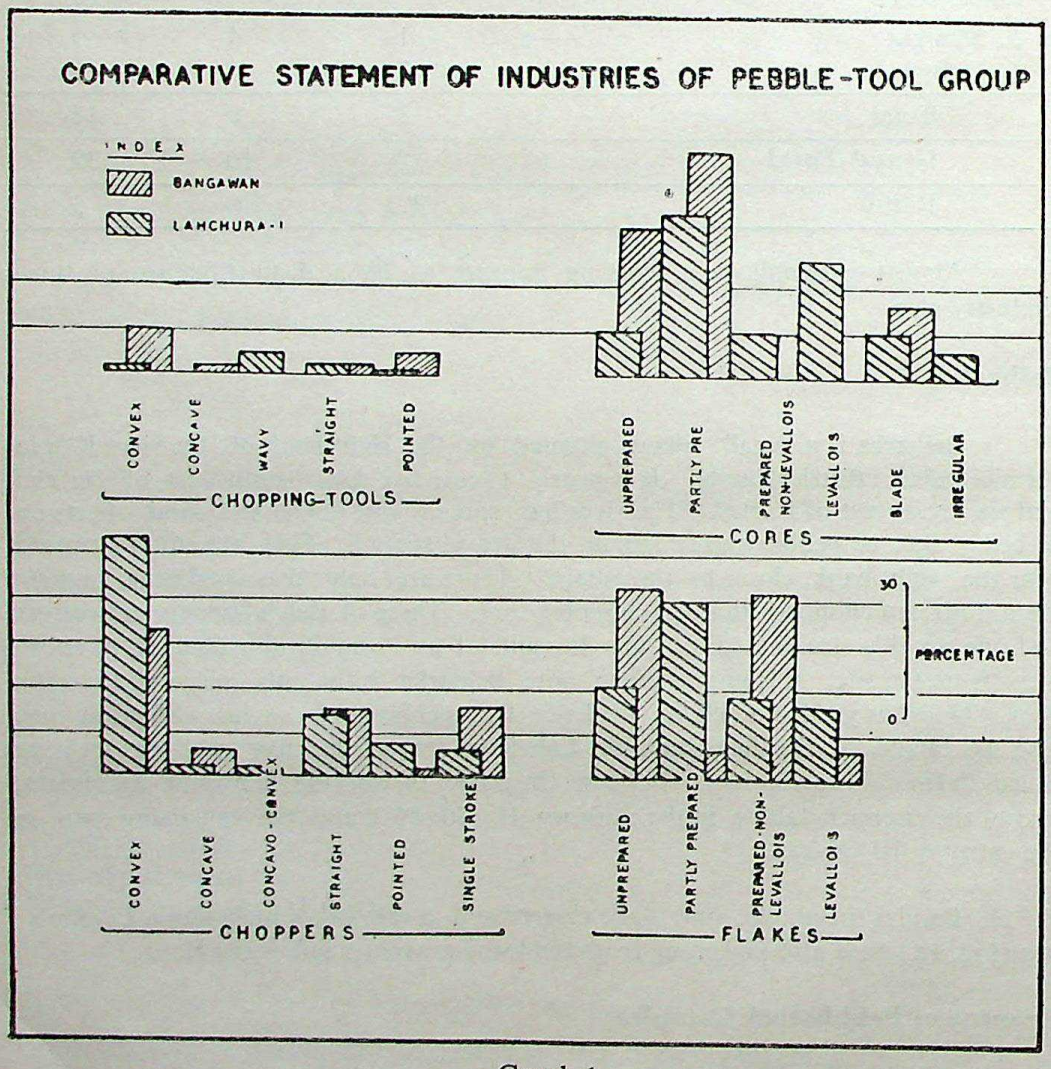
of this culture. There is a remarkable homogeneity not only in the topographical features, of at least two sites, but also in their tool-types as well as techniques employed in manufacturing them. Convex-chopper made on a pebble is a typical tool-type of all these industries. Similarly, flakes and flake-tools appear in a small proportion in Lahchura and Bangawan assemblages. From the point of view of technique, there is a definite evidence for the use of Levallois technique from Lahchura, but it was employed in a limited measure. However, it is absent in the other two. T he typological uniformity of these industries is amply reflected by the comparative histogram (Graph 1).



Graph 1

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B—ACHEULIAN INDUSTRIES

In most parts of the world where there is an evidence for the Lower Palaeolithic phase, Acheulian industries occur in various stages. The time span, assigned to these industries, is also very large (from the Mindel to the Riss-Wurm interglacial). In Asia, the Indian sub-continent is probably the richest in Acheulian material. Although suggestions have been made regarding the evolutionary stages within this complex in India also, a definite sequence is yet to be established. To the best of our knowledge, there is no stratigraphical evidence anywhere in this sub-continent to support the separate existence of Abbevillian and Acheulian stages. Everywhere, the main tool types of the Acheulian industries appear to be handaxe, both crude and well-made, flake-cleaver, and other flake tools, though their proportion varies from industry to industry.

Two sets of Acheulian industries are noticed in Southern Uttar Pradesh. The difference between the two is mainly based upon the presence or absence (near absence) of pebble-tools. In the first case, there are industries which contain from 20 to 30% pebble-tools against the total number of finished tools, or 12-20% of all the artefacts (excluding waste-products). In the other case, pebble-tools are either absent or appear in a negligible proportion (less than 5%). Handaxe and cleaver remain the important tool types in both the groups. Evidently, this division is typological, and does not find stratigraphical confirmation. It may also be mentioned that these two sets of Acheulian industries are not peculiar to our region only. They have been noticed in other parts of the sub-continent as well. In fact, Jayaswal has pointed out to one more group of the Acheulian industries, which are characterised by an overwhelming occurrence of cleavers. According to her, Nagarjunakonda in the Krishna basin and Chirki-Nevasa in the Pravara basin are the two representative sites of this group.[1] She has kept them under the head "Cleaver group". In our opinion, there is hardly any justification for the proposed name, since it tends to minimise the importance of other tool types appearing in fairly large proportions. Besides, the number of handaxes in both the above mentioned industries is in no way negligible. The question has been discussed in detail in the last chapter. However, there are a few industries in our region also in which the cleavers outnumber the handaxes.

Gopipur

The village Gopipur is situated nearly ten kilometres south-west of Manikpur in Banda District. The river Bardaha flows nearly one kilometre south of the village. The tools (Figs. X-XIII) are found in the boulder-cobble deposit and the boulder-spread of the river, and also on the nearby fields.

1. Jayaswal, V., *A Study of Prepared Core Technique in Palaeolithic Cultures of India*, Unpublished thesis, B.H.U., 1973, Chapter III.

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TABLE 12

Artefact-type	Nos.	%
1. Handaxe		
A. Ficron	1	2.2
B. Semi-oval	1	2.2
C. Sub-triangular	1	2.2
D. Amygdaloid	1	2.2
Total of Handaxes	4	8.8
2. Flake-cleaver	6	13.6
3. Chopper	7	15.9
4. Split pebble	1	2.2
5. Side scraper		
A. Single	3	6.8
B. Double	4	9.0
C. Transverse	2	4.5
D. Convergent	1	2.2
Total of Side scrapers	10	22.5
6. Simple flake	2	4.5
7. Core		
A. Partially prepared	4	9.0
B. Prepared non-Levallois	5	11.3
C. Levallois	5	11.3
Total of Cores	14	31.6
Grand Total	44	99.1

The four handaxes of the industry represent four different types. Two of them, A and C, bear marks of partial work on the under surface. All the four specimens are made on flakes. Type D is partly broken. Like handaxes, all the cleavers are also on flakes. They are divisible into two types. Type A is alternately worked on two sides, and shows some resemblance with Tixier's type-O.[1] The alternate working has resulted in roughly parallelogrammatic cross-section. In type-B, one side of the flake was already thick, while the other side was made so by high angle bold working. Only three out of the seven choppers are made on pebbles. Among the

1. Referred to by Bordes, F., *Typologie du Palaolithique Ancien et Moyen*, pp. 63-66

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rest two are flat nodules, and two thick flakes. But, all the seven have broad convex working edge, recalling the typical Lahchura chopper. Though there are only ten side-scrapers, all made on flakes, yet they represent as many as four types. Single and double side scrapers form the dominant types.

It is interesting to note that out of twenty four flakes, only two are unretouched, while all the others have been converted into tools. The fourteen cores of the industry give an idea about the blank-detaching techniques. Preparation of the core was a normal practice. But it was not always done perfectly and in the Levallois fashion. Five Levallois cores including one disc core indicate the advancement achieved in the field of detaching flakes.

The distribution of size of the artefacts in the industry is being presented in the following table :

TABLE 13[1]

LENGTH

Size-range (in mm.)	Handaxe	Cleaver	Scraper	Flake	Core	Chopper
30- 59	—	—	—	—	1	—
60- 79	—	—	—	2	—	1
80- 99	—	1	1	—	5	2
100-119	1	2	3	—	2	1
120-139	1	1	3	—	6	3
140-159	—	1	2	—	—	1
160-179	—	—	—	—	—	—
180-199	1	—	1	—	—	—
Total	3	5	10	2	14	8

WIDTH

Size-range (in mm.)	Handaxe	Cleaver	Scraper	Flake	Core	Chopper
50- 69	1	—	—	—	—	1
70- 89	—	1	2	2	6	1
90-109	3	2	1	—	1	1
110-129	—	2	7	—	5	3
130-149	—	1	—	—	1	2
150 & above	—	—	—	—	1	—
Total	4	6	10	2	14	8

1. The length of the two broken specimens has not been measured, but they have been included in the later part of the table indicating width of the artefacts.

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As indicated by the table, there is a marked uniformity in the size of the artefacts of Gopipur. A large majority of them falls in the range of 80-139 mm. length-wise. On the other hand, only four specimens measure less than 80 mm. in length, and only six fall in the higher measurement range. Similar also width-wise, majority of the artefacts belongs to the measurement range of 70-129 mm.

Nihi

The tools (Figs. XIV-XVII) of this industry were found in the boulder-gravel deposit and the bed of the Bardaha river, from where the village is nearly three kilometres west. From Manikpur, the site is about nine km. south on a forest road. Only two out of fifty eight artefacts were found *in situ* from the cemented boulder deposit, forming the lower stratum of the section, described in chapter II.

A techno-typological classification of the industry is given below in the form of a table :

TABLE 14

Artefact-Type	Nos.	%
1. *Handaxe*		
A. Amygdaloid	1	1.7
B. Backed	3	5.1
C. Limande	1	1.7
Total of Handaxes	5	8.6
2. Cleaver	2	3.4
3. *Side scraper*		
A. Simple convex	1	1.7
B. Simple concave	1	1.7
C. Simple concavo-convex	1	1.7
D. Double	1	1.7
E. Double denticulate	1	1.7
F. Transverse	1	1.7
Total of Side-scrapers	6	10.2
4. Notched flake	1	1.7
5. Chopper	5	8.6
6. Chopping-tool	1	1.7
7. *Simple Flake*		
A. Partially prepared	5	8.6
B. Prepared non-Levallois	4	6.9
C. Levallois	3	5.6
D. Broken/undetermined	2	3.4
Total of flakes	14	24.2

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Artefact Type	Nos.	%
8. *Core*		
A. Unprepared	4	6.9
B. Partially prepared	3	5.1
C. Prepared non-Levallois	5	8.6
D. Para Levallois	4	6.9
E. Levallois	8	13.7
Total of cores	24	41.1
Grand Total	58	99.5

Backed Handaxes form an important feature of this industry (Fig. XV, 1). One of them contains deep, big, irregular scars, and thus from the point of view of working, may be termed as Abbevillian. The remaining two are in fact partial handaxes, since the working on the under-surface is not complete. They show some resemblance with the backed bifacial tools of La Micoque,[1] '*Bockstein messers*' of Germany,[2] and the '*Prodniks*' of Poland.[3] Similarly, the only '*Limande*' of the industry is also partially worked on the ventral surface (Fig. XIV, 2). Among the two cleavers, one is made on flake and the other on nodule. The flake-cleaver has parallelogrammatic cross-section due to alternate working on sides (Tixier's type O). The other specimen is partly bifacial. The six chopper-chopping-tools of the industry are made on pebbles (two), thick flakes (two), nodule (one) and core (one). This distribution is somewhat in agreement with that of the Gopipur industry. The limited number of side scrapers presents a large variety. One of them is made on core. Like the previous industry, there is one transverse scraper in the present one also. Besides, there is one double denticulate as well. It is surprising that the core and flake types of the industry do not stand in perfect agreement. While the Levallois and Para-Levallois (Victoria-West) cores constitute fifty per cent of the total, there are only three Levallois flakes out of the total of fourteen. But, among the side scrapers, five are Levallois flakes. There is no corresponding flake of the Para-Levallois cores.

The tendency of the artefacts to be massive is not only evidenced by the flakes and cores, but also by the handaxes, which lie in the length range of 140 to 199 mm. The other feature, which is apparent from the table, is that most of the flakes and cores of the industry are broad.

The size of the artefacts is being given in the following table :

1. Peyrony, D., La Micoque. 'Les Fouilles Recentes. Leur Signification', *Bulletin de la Societe Prehistorique Francaise*, Vol. 35, 1938, pp. 257-283; and Bosinski, G., 'Bemerkungen zu der Grabung, D. Peyronys in La Micoque', *Fundamenta*, Reihe A, Band 2, Koeln and Wien, 1970, p. 52ff.
2. Wetzel, R. and Bosinski, G., *Die Bocksteinschmiede*, Stuttgart, 1969.
3. Bordes, F., *The Old Stone Age*, pp. 113-116.

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TABLE 15

LENGTH

Size-range (in mm.)	Artefact-Types						%
	Handaxe	Cleaver	Scraper & Notch	Flake	Core	Chopper-Chopping	
30- 59	—	—	1	—	1	—	3.5
60- 79	—	—	1	2	1	2	10.7
80- 99	—	—	2	2	5	—	16.0
100-119	—	—	—	3	5	2	17.8
120-139	—	1	2	2	3	1	16.0
140-159	2	1	1	3	5	1	23.2
160-179	1	—	—	—	2	—	5.3
180-199	2	—	—	—	2	—	7.1
Total	5	2	7	12	24	6	99.6

BREADTH

50- 69	—	—	1	—	2	—	5.3
70- 89	2	—	—	1	—	1	7.1
90-109	2	—	—	3	2	1	14.2
110-129	1	1	4	3	5	4	32.1
130-149	—	1	1	2	—	—	7.1
150 & above	—	—	1	3	15	—	33.9
Total	5	2	7	12	24	6	99.7

Parsidhia

Parsidhia is a small village in the Meja *tahsil* of Allahabad district. It is situated at a distance of nearly three kilometres south-east of Deoghat on the Deoghat-Drummondganj road, at the foot of a hill range, locally known as Ramgarhwa. The site has yielded two different classes of assemblages, which, on techno-typological grounds, may be assigned to the Lower and the Middle Palaeolithic phases. The tools of the former are found at the toe of the slope of the Ramgarhwa, while those of the Middle Palaeolithic are scattered on the lower and middle portions of the gentle slope. At a place near the toe of the slope, there is a deep rain gully, at the bottom of which some massive cores and flakes of the Lower Palaeolithic phase were noticed. This may lead to a possible suggestion that there is a definite horizon of these tools at Parsidhia. From the finds it appears to be a factory site. Whether the Lower Palaeolithic man also settled at this place can be determined only after an extensive excavation at the site.

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The following table indicates the tool, flake and core types (Figs. XVIII-XIX) of the Lower Palaeolithic industry found at Parsidhia.

TABLE 16

	Artefact-Type	Nos.	%
1.	Partial Handaxe	1	4.0
2.	Cleaver	3	12.0
3.	Straight side scraper	2	8.0
4.	Double denticulate on blade	1	4.0
5.	Notched tool	1	4.0
6.	Partially retouched flake	2	8.0
	Total of finished tool types	10	40.0
7.	Levallois flake	1	4.0
8.	Prepared non-Levallois flake	2	8.0
9.	Partially prepared flake	1	4.0
	Total of flake types	4	16.0
10.	Levallois core	3	12.0
11.	Prepared non-Levallois core	4	16.0
12.	Partially prepared core	3	12.0
13.	Irregular blade core	1	4.0
	Total of core-types	11	44.0
	Grand Total	25	100.0

The most striking feature of the tool-kit of this industry is its massiveness, as is evident from the size-range of its artefacts (due to a small number of artefacts no table is being given). For example, not a single flake of this industry is smaller than 114 mm. The flakes (both simple flakes and finished tools made on flakes) measure in length between 114 and 200 mm., but most of them fall in the length range of 114-130 mm. However, the width in most cases does not exceed the length. Width-wise, they measure betweed 98 and 188 mm., the representative range being 113 to 116 mm. It is rather surprising that the cores of this industry are smaller in size than the flakes. They fall in the length range of 55 to 164 mm., but a majority is in 93-112 mm. range. The width range is 78-154 mm., the representative range being that of 80-90 mm.

The above observation leads to the natural assumption that massive flakes were detached from the big blocks of quartzite, which are locally available in abundance. Almost all the tools, including handaxe, cleaver and sidescraper, are made on such massive flakes. Even the only blade of the industry is endowed with

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the quality of massiveness. Some of the cores and the flakes, grouped under the head prepared non-Levallois, bear marks of thorough preparation of the sides, but, at the same time, their dorsal surface is left unprepared.

Mahugarh

It is a factory site on a small hillock of sandstone, situated nearly 1.5 km. south of the village Mahugarh and about two km. south-east of Drummondganj, in Mirzapur district. The site is only a few hundred metres away from the river Seoti, a tributary of the Belan. The southern slope of the hillock is particularly rich in artefacts, among which the massive flakes and the corresponding cores attract the attention most.

The following table indicates the various tool, flake and core types (Figs. XX-XXIV) and their percentages. The percentage has been calculated in two ways, *i.e.*, against the total number of artefacts of the industry, and against the number of specimens in each macro-group of finished-tools, flakes and cores.

TABLE 17

S. No.	Artefact-Type	Nos.	Percentage against	
			Group	Industry
I.	*Finished tool*			
1.	Pseudo handaxe	2	3.3	1.6
2.	Cleaver	17	28.0	14.5
3.	Chopper	1	1.6	0.8
4.	Knife	1	1.6	0.8
5.	Notched tool	1	1.6	0.8
6.	Denticulated tool	9	14.7	7.5
7.	Straight side scraper	4	6.5	3.3
8.	Concave side scraper	4	6.5	3.3
9.	Convex side scraper	9	14.7	7.5
10.	Convexo-concave side scraper	2	3.3	1.6
11.	Round scraper	1	1.6	0.8
12.	Transverse scraper	1	1.6	0.8
13.	Double side scraper	3	4.9	2.5
14.	Flake with retouched top	3	4.9	2.5
15.	Partially retouched flake	3	4.9	2.5
	Total of the finished tools	61	99.7	50.8

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S. No.	Artefact Type	Nos.	Percentage against	
			Group	Industries
II.	*Simple flake*			
	A. Unprepared	2	6.4	1.6
	B. Prepared non-Levallois	20	64.5	16.9
	C. Levallois	9	28.9	7.5
	Total of flakes	31	99.8	26.0
III.	*Core-type*			
	A. Unprepared	1	3.7	0.8
	B. Partially prepared	2	7.4	1.6
	C. Prepared non-Levallois	8	29.6	6.6
	D. Levallois	16	59.2	13.7
	Total of cores	27	99.9	22.7
	Grand Total	119		99.5

It is interesting to note that there is no genuine handaxe in the industry. The two pseudo-handaxes show working on one of the surfaces only, while the other face is humped naturally, or contains marks of primary flaking. It is the cleavers which give the industry an Acheulian character. Their most noteworthy feature is that they are all made on broad or elongated flakes. The broad ones at times indicate the use of Para-Levallois or Victoria-west technique. The elongated ones, on the other hand, can be compared with those resulting from the application of Vaal technique. On the basis of the mode of preparation, these flakes and their corresponding cores may be grouped under Leavallois, as well as prepared non-Levallois. There is no uniformity in the mode of secondary working, appearing on cleavers. From the point of view of secondary working, they may be classified into the following types :

(i) Bifacially worked cleavers (7); four of them are bifacially worked on both the sides, while in three cases only one side is worked bifacially and the other unifacially.

(ii) Cleaver with secondary working on the dorsal surface (2). The cross-section in this case is roughly trapezoidal.

(iii) Cleaver with secondary working on the ventral surface (7). The working appears on both or one side only. Similarly, the cross-section is roughly trapezoidal or triangular.

(iv) Broken cleaver (1). One of the sides is unifacially worked on the ventral surface, while the other is broken.

The other important typological feature of the industry is the presence of nine denticulates and one notched tool. The technique adopted for manufacturing

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denticulates is either making a few continuous clactonian notches (created by single deep scar) or retouching one or both sides and or ends partly from the dorsal surface and partly from the ventral. Like other Acheulian industries of Southern Uttar Pradesh, Mahugarh industry also contains some side scrapers of various types.

In technique the Mahugarh industry shows preference for the Levallois, as is evident from the cores. The use of Para-Levallois or Victoria-west technique seems to be limited to cleaver-flakes. The table given below indicates the various classes of flakes including those converted into finished tools.

TABLE 18

Artefact-type	Flake-Type				Total
	Unprep.	Partially prepared	Prepared non-Lev.	Lev.	
Cleaver	1	2	7	6	16
Scraper	1	5	10	8	24
Denticulate & notched tool	—	—	2	8	10
Flake with partial retouch	—	—	1	2	3
Simple flake	2	—	20	9	31
Total & %	4 (4.7)	7 (8.3)	40 (47.6)	33 (39.2)	84 (99.8)

The industry under discussion is characterised by massiveness of the artefacts. The following table indicates the distribution of length and breadth of the artefacts.

TABLE 19

LENGTH

Size-range (in mm.)	Handaxe	Cleaver	Denticule & Notch	Scraper etc.	Flake	Core	Total	%
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
40-59	—	—	—	1	—	1	2	1.7
60-79	—	—	—	4	3	1	8	6.8
80-99	—	1	2	3	6	5	17	14.5
100-119	—	1	3	3	6	5	18	15.3
120-139	1	7	4	3	3	3	21	17.9
140-159	1	4	1	6	3	4	19	16.2
160-179	—	2	—	5	3	3	13	11.1
180-199	—	1	—	4	3	—	8	6.8
200-219	—	—	—	1	2	1	4	3.4
220-239	—	—	—	1	2	2	5	4.2
240-259	—	—	—	—	—	2	2	1.7
Total	2	16	10	31	31	27	117	99.6

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BREADTH

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
40-59	—	—	—	2	3	—	5	4.2
60-79	1	—	1	3	2	1	8	6.8
80-99	1	5	4	3	2	1	16	13.6
100-119	—	4	3	9	1	10	27	23.0
120-139	—	7	1	4	6	2	20	17.0
140-159	—	—	—	5	6	3	14	11.9
160-179	—	—	—	4	5	4	13	11.1
180-199	—	—	—	1	3	—	4	3.4
200-219	—	—	1	—	2	3	6	5.1
220-239	—	—	—	—	1	1	2	1.7
240-259	—	—	—	—	—	2	2	1.7
Total	2	16	10	31	31	27	117	99.5

Singrauli-Basin

The Pan-Indian Prehistoric Exploratory Expedition under the leadership of Zeuner located the Lower Palaeolithic sites on the south bank of the Balia Nadi, opposite the village Hinauti in the Singrauli basin in the southernmost part of the Mirzapur district. The tools were found from many localities around the village. The cliff section found near Hinauti and Kota on the Balia Nadi, a small tributary of the Rihand, consists of an alluvial deposit of a little more than five ft. in thickness, underlain by a three ft. thick pebble-bed. The lowermost stratum is formed by sand and *kankar* deposit, which rests upon the Talchirs, the bed rock. The pebble bed proved to be implementiferous. In fact, Cockburn had already reported palaeoliths from Balia Nadi, as early as the later half of nineteenth century.[1]

The results of the investigations, made by the above expedition, were published by Krishnaswamy and Soundara Rajan.[2] The authors regard the site a meeting place of the Soan and Madras industries, since, according to them, the Singrauli basin occupies a central place on the Soan-Anyathian axis. The fifteen per cent pebble tools, as per authors, represent the Soan influence, and 42.7% handaxes and cleavers are assignable to the Madras tradition (Fig. XXVIII A & B). However, the hypothesis does not hold water in the light of numerous such Lower Palaeolithic industries throughout the Peninsula, which contain both these elements in varying proportions.

We intend to reproduce the following table given by Krishnaswamy and Soundara Rajan, showing distribution of various artefact-types in the collection from the Singrauli basin.[3]

1. Cookburn, J., *op. cit.*, 1888.
2. Krishnaswami, V.D. & Soundara Rajan, K.V., 'The Lithic Tool-industries of the Singrauli Basin, District Mirzapur', *Ancient India*, No. 7, pp. 40-55.
3. *Ibid.*, p. 47.

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TABLE 20

Type of Implements	Total	%
'Chopper-Chopping' tool	17	15.5
'Hand-adzes'	...	...
'Proto-handaxe'	1	0.9
Handaxes	38	34.5
Cleavers	9	8.2
Cores and core-scrapers	8	7.3
Levallois flakes	8	7.3
'Proto-Levallois' flakes	20	18.2
Miscellaneous Clacton flakes (waste flakes excluded)	9	1.2
Total	110	100.0

From the point of view of technique, the industry shows preference for Proto-Levallois and Levallois flakes. Surprisingly, all the cores of the industry have been termed as Clactonian by the writers, although they "...comprise biconical discoidal and spindle types".[1] From the photograph (Plate XXI)[2], many of them look like true Levallois cores.

Lalitpur

Lalitpur is known as one of the most important factory sites of the Acheulian cultures in northern India. Singh found several workshops within a radius of a mile from the railway station, including the vicinity of Chhatrapal temple.[3] Tools were also found in the gravel deposit of Shahzad river and the Biana Nala. Laterite formations are also visible at some places, particularly near the railway track. The section on the Shahzad river shows a cemented conglomerate, lying on the bed-rock, and overlain by ten to fifteen feet of yellowish brown silt. Various areas around Lalitpur, a district town lying south of Jhansi, were excavated by Singh[4] and Joshi,[5] with a view to identifying the actual habitation floors. Although, unfortunately, this expectation was not fulfilled by the excavations, yet there is ample evidence to suggest that the area must have been actually inhabited by the Acheulian man. The picturesque topography and a very large quantity of artefacts found in the area support this suggestion.

1. *Ibid*, p. 58.
2. *Ibid.*
3. *I.A.R.*, 1961-62, p. 57.
4. *Ibid.*
5. *Ibid.*, 1963-64, pp. 49-51.

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The Acheulian character of the industries is magnified by numerous handaxes, cleavers, and associated tools (Figs. XXV-XXVIII). The rocks used for manufacturing, implements are granite, sandstone and quartzite. The factory site near the Chhatrapal temple indicates preference for sandstone rock against the local granite. This means that the raw material was imported from distant places, the nearest known sandstone quarry being at Jiron, about six miles away from the site.[1]

According to Singh, all the implements are made on flakes, prepared by Vaal technique, which involves core preparation.[2] Large flakes detached from "boulders" and big blocks of stones were converted into handaxes and cleavers by secondary working. Several such flakes and corresponding cores were found in excavations. However, Jayaswal has noted that the assertion that all the handaxes and cleavers are made on flakes is hardly tenable.[3] For, many of them are so thoroughly worked that it is almost impossible to make out their primary form. According to her, many of the handaxes and a few cleavers were probably made on cores. Among the handaxes, several types were noticed, *viz.*, pear-shaped, ovate, cordiform, triangular and double pointed (*Limande*). Besides, one of the drawings (Fig. 23 B-7),[4] given by Sankalia, appears to be that of a *ficron*. Jayaswal has noted the presence of a few backed handaxes as well, which are somewhat similar to the backed bifaces of the Micoqulan culture.[5] Among the cleavers, the butt is both U and V shaped. The flake cleavers, very much similar to the South African forms, constitute the majority (Fig. XXV, 1). However, there are also a few specimens in the industry, which contain handaxe type bifacial working on the sides and the butt (Fig. XXV, 3). This type of cleaver is an important feature of the Acheulian culture of Western Europe. In the Nagpur collection of Lalitpur, there appears one more type—a thick narrow cleaver made on flake, with abrupt working on one side, and roughly trapezoidal cross-section. The specimens exhibiting the use of Victoria-West technique are rare in this industry. Various types of side scrapers constitute another typological feature of the industry, A good number of them is simple convex scraper and convergent scraper. Double convergent-scraper or *Limace* probably also appears in the industry.[6]

1. Sankalia, H.D., *Prehistory and Protohistory*, etc., p. 109.
2. *Ibid.*
3. Jayaswal, *A Study of Prepared Core Technique in Palaeolithic Cultures of India*, Chapter III.
4. *op. cit.*, p. 110.
5. Bosinski, G., 'Bemerkungen zu der Grabung D. Peyronys in La Micoque', *Fundamenta*, Reihe A, Band 2, pp. 52ff. Also, by the same author, 'Eine Variante der Micoque-Technik am Fundplatz Buehlen, Kreis Waldeck, *Jschr, mitteldt. Vorgesh.*, Vol. 53, 1969, pp. 59-74.
6. Some of the above observations are based upon the notes of Dr. (Miss) Vidula Jayaswal, which she prepared after examining the Lalitpur collections of the Deccan College, Poona, and the Prehistory Branch of the Archaeological Survey of India, Nagpur. The notes also contain long descriptions of artefacts.

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Singh has pointed out to the extensive use of Vaal technique for detaching flakes at Lalitpur. In this technique, the outline of the proposed flake was prepared on the parent core, which is invariably massive. The platform was often prepared by detaching one big flake at a suitable place. In fact the process of the preparation of the core is almost the same which is followed in the Levallois and Proto-Levallois techniques. The only difference is that the resultant flakes are large in size in the case of Vaal technique, while they are small in the other ones. Jayaswal has recorded the presence of not only a good number of Levallois flakes, but also a few Levallois points and blades in the Lalitpur industry.[1]

Other Industries

The tools of the Lower Palaeolithic phase showing Acheulian characteristics have been found from numerous sites in Southern Uttar Pradesh. Some of the collections are also fairly big. They were, however, not available to the author for study. Nor are there any published accounts of these industries. Hence, no detailed analysis was possible. Besides, such other collections were also left out, which contained only a small number of artefacts; they may hardly be called representative collections. Only a brief account of some of them is given below.

The lowermost cemented gravel (boulder conglomerate) of the Belan has yielded some Acheulian artefacts. We found only two massive flakes, slighlty rolled, from the *in-situ* deposit. They compare well with similar flakes of the foctory sites of the region. However, Sharma has claimed to have recovered a large number of tools from this gravel. They include handaxe, cleaver, flake and core, besides a few pebble tools.[2] Since the boulder conglomerate deposit is very rarely noticed *in situ* along the whole length of the Belan and its tributaries, it is strange that all the artefacts in this case were found from the *in situ* deposit and not from the gravel spread of the bed. Artefacts of the Acheulian facies have been found from the loose gravel beds of various rivers and *nalas* in Southern Uttar Pradesh. Four specimens, including a Levallois flake, were picked up from the Ken bed at Durendi, near Banda.[3] The loose gravel of the Baghain near Barachha, about seven km. south of Naraini in Banda district, yielded one flake cleaver and one simple flake having the shape and size of a cleaver.[4] R.V. Joshi found handaxes and choppers of quartzite from the gravel bed of the Betwa, between Deogarh and Moth in Jhansi district.[5] R.K. Verma picked up some large flakes, scrapers and cleavers from the dry river bed at Hathinala in Mirzapur district.[6] He also found some artefacts of 'Series I' in the loose gravel of

1. Jayaswal, *op. cit.* 1973.
2. Sharma, G. R., 'Stone Age in the Vindhyas and the Ganga Valley', in *Radiocarbon and Indian Archaeology*, pp. 107-8. However, some of the illustrated specimens do not look like handaxes.
3. Pant, P.C., 'Some Lithic-tool Industries of Banda', *Bharati Supplements*, No. 2, p. 11.
4. *Ibid.*, p. 14.
5. *I.A.R.*, 1959-60, p. 46.
6. *Ibid.*, p. 48.

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the Son near Chopan in the same district.[1] Handaxes, cleavers and scrapers made on flakes of sandstone and quartzite were reported from the confluence of the Thema and the Kanhar rivers and on the Malia near Harna-Kachar in district Mirzapur and the fort of the Hathinia Pahar in the district Varanasi.[2] Nisar Ahmad found tools of Early Stone Age at Bhadora from the bed of Umrar *nadi*, and near Barari and Basari on the Mahan *nadi* in the Son valley of the Mirzapur district.[3] A few Early Stone Age artefacts were also reported from the lowermost detrital formation of the Yamuna near Mau in the Banda district.[4] Pebble tools, handaxes, cleavers and scrapers were found in the loose gravel and *in situ* deposits of various small rivers and *nalas* of the Balan Valley.[5]

Besides the above finds, dozens of factory sites, yielding Acheulian tools, have also been located in the various parts of Southern Uttar Pradesh. The valleys of the Belan and its tributaries, the Seoti, the Tundiari and the Gurma, etc., are particularly rich in this respect. It was noted that almost all the factory sites were located on the northern fringes of the Kaimur range. Most of them are found on the small hillocks of sandstone, shale and quartzite, being projections of the large hill slope, and are rare near the top. Almost all the artefacts are made of coarse to medium grained quartzite. They are unrolled and only lightly patinated. Some of the important factory sites of the Belan region are Chhatarpalia, Khanuhakhan, Machharihawa, Atreji, Belarahi, Kodawari, Karaundahia, Itaha, Mahua-Kachchha, Orawa, Paniha, etc. in the Allahabad district and a few around Drummondganj in the Mirzapur District.[6] Among them, Chhatarpalia is said to be particularly rich.[7] Out of a total number of 262 artefacts, according to Jayaswal,[8] who had an opportunity to make a first hand study, there are 4 choppers, 10 chopping-tools, 10 handaxes, 20 cleavers, 3 bifaces (not handaxes), 15 side scrapers on core, 2 points on core, 26 side scrapers on flake, 126 blanks, and 30 cores. Quite a few specimens including cores are massive, although some others are smaller in size. She did not note the presence of Levallois element in the industry.

Resume of the Industries of Acheulian Tradition

The above discussion indicates that there is hardly any techno-typological uniformity among the various Acheulian industries of the region. Firstly, the pebble-tools do not appear uniformly in all the industries. They form more than 15% of the

1. *Ibid.*
2. *Ibid.*, 1962-63, p. 32.
3. *Ibid.*, p. 37.
4. *Ibid.*, 1968-69, p. 34.
5. *Ibid.*
6. *Ibid.*, 1969-70, p. 36.
7. The material was unfortunately not available to the author for study.
8. Jayaswal, Vidula, *A Study of Prepared Core Technique in Palaeolithic Cultures of India*, p. 275 ff.

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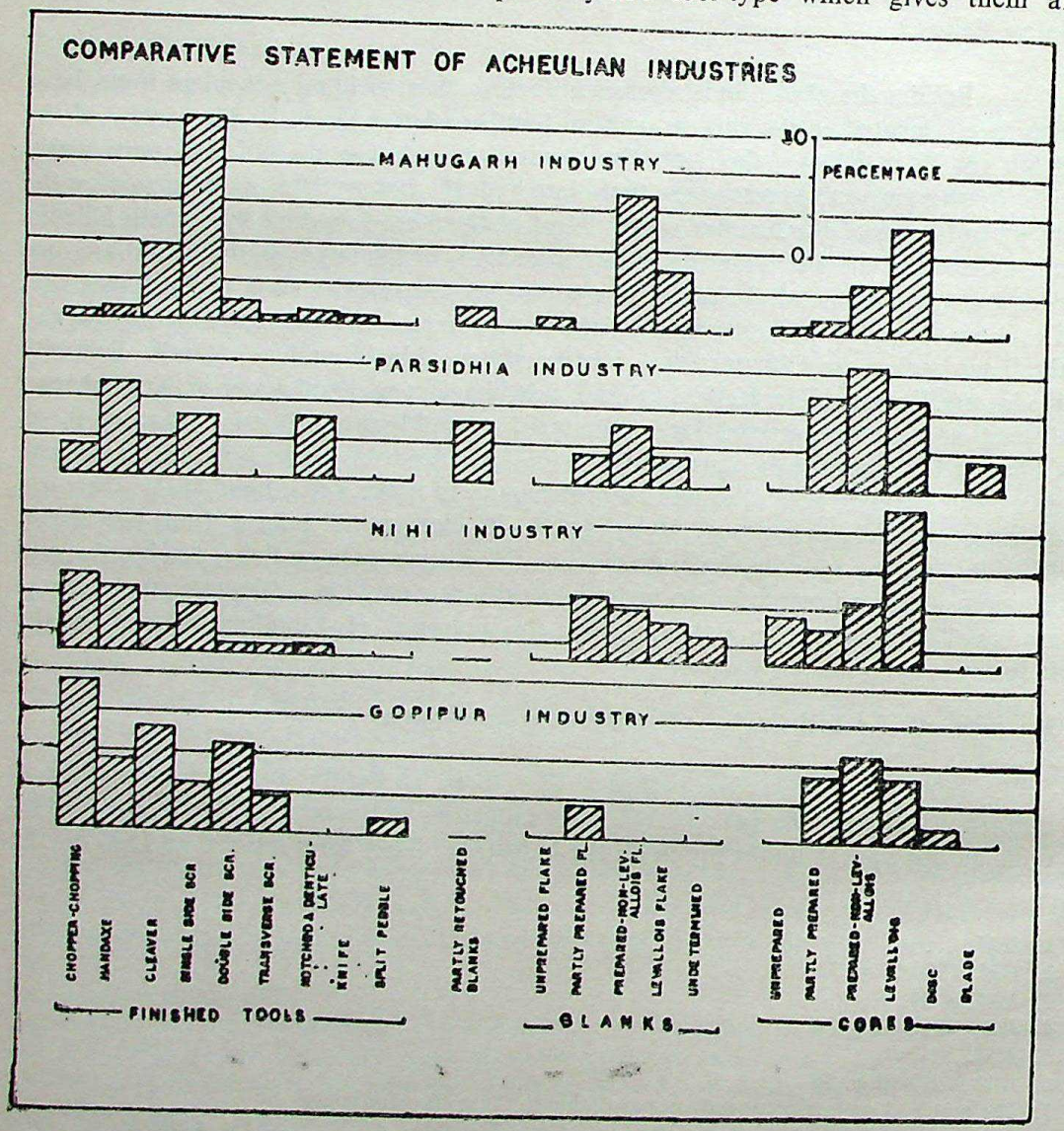
total in Singrauli basin and Gopipur, and occur in a good proportion (not as much as in Singrauli basin) in Lalitpur and Nihi. Yet it is not possible to group all of them under the same group, since they differ in other typological details. The handaxes appear in a large number in Singrauli basin and Lalitpur industries, while their proportion is considerably reduced in all the other industries. The pebble-tools are absent at Mahugarh and Parsidhia, although the river beds are not far away from both the sites. It needs to be emphasised that the industries found at Lalitpur, Gopipur and Mahugarh contain a good proportion of cleavers, almost all of them made on flakes. In some of the industries, it is precisely this tool-type which gives them an



Graph 2

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Acheulian character. It is particularly true in the case of Mahugarh. Levallois technique was commonly used in all the industries. Except Singrauli basin and Lalitpur, it is the general massiveness of the artefacts which impresses most. The techno-typological features of the different Acheulian industries of the region have been presented in the form of a histogram (Graph 2).

It is interesting to note that the pebble-tools in varying proportions are always present in the industries found in the river gravels. On the other hand, the choppers and chopping-tools of the factory sites, whenever present, are mostly made on thick flakes and nodules, and not on pebbles, although the river beds lie only a few metres away in many cases.

LIST OF ILLUSTRATED SPECIMENS

LAHCHURA - 1

Fig. I

1. Chopper with convex edge
2. Chopper with convex edge
3. Chopper with convex edge
4. Chopper with straight edge

Fig. II

1. Chopper with convex edge
2. Chopper with pointed edge
3. Chopping-tool with wavy edge
4. Side scraper on flake

Fig. III

1. Chopper with straight edge
2. Chopper with convex edge
3. Chopper with convex edge
4. Chopper with pointed edge

Fig. IV

1. Unprepared core on a pebble
2. Chopping-tool with concave edge
3. Chopper with pointed edge

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4. Small Levallois core on a pebble
5. Chopping-tool with wavy edge

Fig. V

1. Side scraper—concavo-convex
2. Prepared non-Levallois flake
3. Levallois core
4. Prepared non-Levallois core

BANGAWAN

Fig. VI

1. Chopper with pointed edge
2. Chopper with convex edge
3. Chopper with roughly straight edge
4. Single stroke chopper with convex edge

Fig. VII

1. Unprepared flake
2. Chopper with convex edge
3. Chopper with convex edge
4. Chopper with convex edge
5. Chopper with convex edge
6. Shouldered blade

Fig. VIII

1. Chopping-tool with convex edge
2. Chopping-tool with convex edge
3. Double chopper
4. Chopping-tool with convex edge

BELHARKA

Fig. IX

1. Chopper with straight edge
2. Levallois flake
3. Flake-cleaver with bifacial working on one side

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GOPIPUR

Fig. X

1. Flake-cleaver with bifacially worked sides
2. Convex side scraper (or knife with natural back)
3. Convergent scraper

Fig. XI

1. Sub-triangular handaxe (partial)
2. Chopper with convex edge

Fig. XII

1. Flake-cleaver with alternately worked sides
2. Disc
3. Simple side-scraper with retouch on ventral surface
4. Amygdaloid handaxe (partial)

Fig. XIII

1. Levallois core
2. Double side scraper with retouch on ventral surface
3. Partially prepared core

NIHI

Fig. XIV

1. Flake-cleaver with bifacial working on one side
2. *Limande* (partial)

Fig. XV

1. Backed handaxe (Abbevillian working)
2 Chopper with convex edge

Fig. XVI

1. Simple concavo-convex side scraper
2. Notched tool on prepared non-Levallois flake
3. Irregular, partially prepared core
4. Partially prepared core

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Fig. XVII

1. Flake-cleaver with bifacial working on one side
2. Chopping-tool on a nodule
3. Prepared non-Levallois flake

PARSIDHIA

Fig. XVIII

1. Partial handaxe (oval)
2. Flake-cleaver with bifacial working on one side

Fig. XIX

1. Denticulate on a thick blade
2. Levallois flake
3. Levallois core

MAHUGARH

Fig. XX

1. Convex side scraper on Levallois flake
2. Pseudo-handaxe
3. Small Levallois core

Fig. XXI

1. Prepared non-Levallois flake with partial retouch
2. Pseudo-handaxe

Fig. XXII

1. Flake-cleaver with bifacial working on one side
2. Convexo-concave side scraper

Fig. XXIII

Massive Levallois core-rest (bifacial)

Fig. XXIV

Prepared non-Levallois core

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LALITPUR

Fig. XXV

1. Flake-cleaver with bifacial working on one side
2. Flake-cleaver
3. Small flake-cleaver with bifacial working on both sides

Fig. XXVI

1. Convergent scraper
2. Flake-cleaver
3. Small thick flake-cleaver
4. Side scraper on split pebble

Fig. XXVII

1. Denticulate with Clactonian notches
2. Small handaxe with big flake-scars
3. Cordiform handaxe (partial)
4. Flake-cleaver with bifacial working on one side
5. Small Levallois flake

Fig. XXVIII

Levallois core

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CHAPTER IV

The Middle Palaeolithic

The evidence for the Middle Palaeolithic phase, or what has been termed as Mousterian by F. Bordes,[1] has been found in all such regions of the Indo-Pakistan sub-continent where the Lower Palaeolithic industries of the preceding phase occur. Although, the claim for the existence of some flake-cultures succeeding the Lower Palaeolithic handaxe industries was made even in the earlier half of the twentieth century,[2] the real credit for identifying the Middle Palaeolithic phase in Peninsular India goes to Sankalia.[3] He discovered a flake industry in the stratified deposits of the Pravara at Nevasa, in the year 1955, which he tentatively called 'Series II'. In the course of time similar industries were found in almost all the parts of Peninsular India. They were variously described as Middle Palaeolithic,[4] Middle Stone Age,[5] Series II;[6] and 'Flake-culture',[7] by different investigators. The stratigraphical position of the industries of this phase is well established now. They are assigned to the second aggradational deposits of the various river valleys. The C^{14} dates obtained for the deposits of Maharashtra place this culture between 40,000 and 17,000 B.P.[8] From the point of view of typo-technology also, the culture distinguishes itself from the preceding Lower Palaeolithic and the subsequent 'blade and bladelet' industries. When the Yale-Cambridge Expedition of 1935 explored the north-western parts of the Indo-

1. Bordes, F., *The Old Stone Age*, London, 1968, p. 98ff.
2. Cammiade, L.A. & Burkitt, M., 'Fresh Light on the Stone Ages of South-East India', *Antiquity*, Vol. 4, 1930, pp. 327-339 ; also, Todd, K.R.U., 'Palaeolithic Industries of Bombay', *Journal of the Royal Anthropological Institute*, Vol. 69, 1939, pp. 257-272.
3. Sankalia, H.D., 'Animal Fossils and Palaeolithic Industries from the Pravara Basin in Nevasa, Dist. Ahmednagar', *Ancient India*, No. 12, 1956, pp. 35-53.
4. Misra, V.N., 'Palaeolithic Cultures of Western Rajputana', *Bull. Deccan Coll. Research Institute*, Vol. 21, 1962, pp. 85-156.
5. For example, Mohapatra, G.C., *The Stone Age Cultures of Orissa*, Poona, 1962, p. 59ff.
6. Sankalia, H.D., *op. cit.*
7. Ghosh, Asok K., 'Flake and Flake-blade Industries in India in the Context of Human Evolution', *The Origin of Homosapiens* (Ed. Bordes), 1969, pp. 95-100.
8. Agrawal, D.P. and Kusumgar, S., *Prehistoric Chronology and Radiocarbon in India*, Delhi, 1974, p. 41ff.

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Pakistan sub-continent, it found a whole series of pebble-tool industries.[1] On stratigraphical grounds, these were assigned to various phases of the Pleistocene. The investigators claimed to have discovered also the evidence for gradual refinement among these industries, which were described as 'Pre-Soan' (a flake culture, devoid of pebble-tools), Early Soan, Late Soan A & B, and Evolved Soan (the term suggested by Movius[2] for the industries found at Dhokpathan and Pindigheb, marking the final development of the Soan Culture). The subsequent writers placed the Late Soan industries in the Middle Stone Age or the Middle Palaeolithic period.[3] The Late Soan phase was supposed to occur in the Potwar region of Pakistan only, till Mohapatra claimed to have discovered some similar industries in Himachal Pradesh.[4] He also pointed out to the techno-typological similarities between his industries and those of the Potwar region. To the best of our knowledge, no similar industry has been found so far in the peninsular part of the sub-continent.

The Middle Palaeolithic phase is well represented in Southern Uttar Pradesh. If the evolved pebble-tool industry found at Lahchura[5] is accepted as belonging to the Middle Palaeolithic complex, the region under study will have the distinction of containing two sets of Middle Palaeolithic industries—(1) those of the peninsular facies, and (2) the pebble-tool industry from Lahchura. It needs to be emphasised here that, though our industries of the Peninsular tradition exhibit some general similarities with other assemblages found south of the Vindhyas, yet they contain several distinguishing techno-typological features of their own. From the point of view of raw material, it is the finer variety of quartzite which was mostly preferred against the crypto-crystalline silica, though the latter was not altogether rejected.

The Middle Palaeolithic industries occur in our region in two ways. Firstly, there are industries from the gravel deposits of the various rivers like the Seoti, the Belan and the Son. In the second category come the numerous factory sites which are almost invariably found on the gentle slopes of the hills of the Kaimur and the Vindhyan ranges. Though, at the sites of the first category, the artefacts come from the stratified deposits, they are so few in number that hardly anything worthwhile can be written about their techno-typological features with any amount of certainty. On the other hand, the factory sites have proved generally rich in finished tools, blanks, cores and waste-chips. Thus, they provide an opportunity to make detailed techno-typolo-

1. De Terra and Paterson, *Studies on the Ice Age in India*, etc., pp. 301-312.
2. Movius, H.L. Jr., *Early Man and Pleistocene Stratigraphy in the Southern and Eastern Asia*, Papers of Peabody Museum of Archaeology and Anthropology, Vol. 19., Cambridge, 1944.
3. Sankalia, H.D., 'Middle Stone Age Culture in India and Pakistan', in *Indian Prehistory - 1964* (ed. Misra & Mate), pp. 35-42.
4. Mohapatra, G.C., 'Preliminary Report of the Exploration and Excavation of Stone Age Sites in Eastern Punjab', *Bull. Deccan College Researeh Institute*, Vol. 25, 1966, pp. 221-237. Also, by the same author, 'Lithic Industries of Himachal Pradesh', *Perspective in Palaeonthropology . D. Sen Festschrift*, (ed. Ghosh, A.K.), pp. 199-212.
5. Referred to earlier in the Chapter III.

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gical analyses. The industries, selected here for detailed treatment, are all obtained from the factory sites.

Lahchura-2

As mentioned earlier the industry was found at the western slope and foot of the long hill running almost parallel to the Dhasan. The site is nearly five hundred metres south of the village Lahchuraghat, district Jhansi. The site is fairly rich, and the artefacts are made on quartzite as well as various crypto-crystalline silica. Although, there is a large variety in the tool-kit, the pebble element dominates throughout. It is interesting to note that the pebble-tools of the chopper-chopping-tool facies are mostly made on quartzite pebbles, while the quartzite and other types of raw material were used for other implements of the industry.

The typological screening of the industry is indicated in the table given below :

TABLE 1

S. No.	Tool-types	Nos.	%
	Chopping-tool		
1.	Round based	2	1.9
2.	Flat based	1	1.0
	Total of chopping-tools	3	2.9
	Chopper		
3.	Flat based	12	11.7
4.	Split based	2	1.9
5.	Flat based single stroke	6	5.8
6.	Round based	8	7.8
	Total of choppers	28	27 2
	Side scraper		
7.	Straight	3	2.9
8.	Convex	3	2 9
9.	Concave	3	2.9
10.	Concavo-convex	3	2.9
11.	Transverse scraper	3	2.9
12.	Double side scraper	1	1.0
13.	Convergent scraper	7	6.8
14.	Shouldered convergent scraper	1	1.0
15.	Angle scraper	5	4.9
	Total of side scrapers	29	28.2

(*Contd.*)

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S.No. Tool-type	Nos.	%
16. Notched flake	8	7.8
Denticulate		
17. Side	1	1.0
18. Top	2	1.9
19. Side and top	3	2.9
Total of denticulates	6	5.8
20. Knife	6	5.8
21. Flake with retouched top & base	1	1.0
22. Blade with marginal retouch	1	1.0
Burin		
23. Offset burin on atypical end scraper	1	1.0
24. Offset dihedral burin	1	1.0
25. Offset burin	1	1.0
26. Single stroke axial burin on flat pebble	1	1.0
Total of burins	4	4.0
27. Partially retouched flake	16	15.6
Grand Total	102	99.3

The above table clearly indicates that the chopper-chopping element (Fig. XXIX) is still well represented, though it does not occupy that dominant position, which one finds in the Lahchura industry-1, and other pebble-tool industries of the Lower Palaeolithic phase. Among the twenty-eight choppers, the flat-based variety predominates, a feature which clearly distinguishes this industry from the Lahchura 1. But, from the point of view of the type of working edge, both exhibit a remarkable similarity. The edge-wise classification is as follows.

TABLE 2

Chopper-type	Split pebble	Flat based	Single stroke	Round based	Total	%
1. Convex	2	9	1	5	17	60.7
2. Concave	—	1	2	1	4	14.2
3. Straight	—	2	1	—	3	10.7
4. Pointed	—	—	—	1	1	3.6
5. Concavo-convex	—	—	—	1	1	3.6
6. Double edged	—	—	2	—	2	7.1
Total	2	12	6	8	28	99.9

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It is evident that the convex chopper continues to be the most preferred type in its group. All the three chopping-tools have wavy edges. The large variety of the side scrapers (Fig. XXX) is a noteworthy feature of the industry. Among them, convergent scraper and angle scraper fare better than the other types. The retouch on these specimens is neat and limited to margins, and appears in medium high angle. Nearly fourteen percent of the finished tool group is formed by notched tools and denticulates. It may be recalled that these tools appear in almost all the Mousterian industries of Western Europe in various proportions.[1] Among the six knives, one is backed by secondary working, two are with partially worked backs, one has a cortexed back, while in the remaining two the thick sides are the result of core preparation. The retouch on the working edge is either unifacial or partly from the dorsal surface and partly from the ventral. The specimen, which is fully backed by secondary working, is denticulated on the working edge. Two out of the six knives, are made on thick blades, while the remaining four are on elongated flakes. Shouldered convergent scraper, made on a Levallois flake, is a beautiful piece of the industry with retouch on both the sides (Fig. XXX, 1). Among the four burins, three are of the offset variety, while the remaining one is a single stroke axial burin, made on a flat pebble. One of the offset burins is made on a blade while the remaining two are on flakes. Typical end scraper is conspicuous by its absence. But there is a burin made on an atypical end scraper.

The various cores and blanks, including those converted into finished tools, give a fairly good idea about the blank detaching techniques, employed in the industry.

TABLE 3

S. No.	Core-type	Nos.	%
1.	Partially prepared core on pebble	8	17.0
2.	Core with prepared side	4	8.5
3.	Prepared non-Levallois core	2	4.3
4.	Levallois Core	17	36.1
5.	Atypical Levallois core	2	4.3
6.	Disc core	1	2.1
7.	Blade/Bladelet core	8	17.0
8.	Irregular core	5	10.6
	Total	47	99.9

If only the core types are taken into consideration, the industry appears to be fairly advanced from the point of view of technique. The cores involving advanced techniques account for nearly sixty per cent of the total. They include

1. Bordes, F., *The Old Stone Age*, pp. 98-105.

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TABLE 4

S. No.	Blank-type	Simple	Retouched (Partially)	Finished tool	Total	%
1.	Unprepared flake	6	1	11	18	19.3
2.	Partially prepared flake	8	4	18	30	32.2
3.	Prepared non-Levallois flake	8	3	6	17	18.2
4.	Levallois flake	4	6	6	16	17.2
5.	Levallois point	—	—	1	1	1.0
6.	Blade	—	—	4	4	4.3
7.	Undetermined	3	2	2	7	7.4
	Total	29	16	48	93	99.6

Levallois, both typical and atypical, disc, and blade and bladelet core. However, the same picture does not emerge from the table of blanks given above. The reason for this anomaly is beyond our comprehension at the moment. It is also a noteworthy feature that a considerable number of flakes, as well as flake-cores, are broad, the ratio between the broad flakes and other flakes being 27 : 55, and that between the broad cores and other cores 15 : 24.

TABLE 5

Size range (in mm.)	Chopper	Chopping tool	Burin	Knife	Scr. Dent. etc.	Part. ret.	Flake	Core	Total	%
LENGTH										
00-19	1	—	—	—	1	—	2	1	5	2.8
20-39	6	—	—	1	12	8	8	12	47	26.4
40-59	9	1	3	2	21	5	10	21	72	40.4
60-79	10	2	1	2	10	3	9	11	48	26.9
80-99	1	—	—	1	—	—	—	1	3	1.6
100-119	1	—	—	—	1	—	—	1	3	1.6
Total	28	3	4	6	45	16	29	47	178	99.7
BREADTH										
00-19	2	—	—	1	2	2	1	3	11	6.1
20-39	4	1	2	3	20	7	12	11	60	33.7
40-59	8	1	2	2	19	7	10	18	67	37.6
60-79	10	1	—	—	4	—	5	11	31	17.4
80-99	2	—	—	—	—	—	1	4	7	3.9
100-119	2	—	—	—	—	—	—	—	2	1.1
Total	28	3	4	6	45	16	29	47	178	99.8

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The obvious conclusion from the table (p. 75) is that most of the artefacts of the industry fall in three measurement ranges, *viz.*, 20-39, 40-59 and 60-79 mm., both length-wise as well as breadth-wise.

The above details of the techno-typological features of the Lahchura industry-2 make it unique among the Middle Palaeolithic industries of the Peninsular India. In this case, the river pebbles of various rocks were fully exploited for manufacturing not only the choppers and chopping-tools, but also other tool types. The proportion between the pebble-tools of chopper-chopping facies and the large variety of flake tools clearly distinguishes it from the preceding Lahchura-1 industry. Undoubtedly, almost all the blank and core types represented in the Lahchura-2 are also to be found in the Lahchura-1, but the proportion of such specimens which involve advanced technique certainly increases in the former.

Parsidhia

The village Parsidhia in *mauja* Mahuli, district Allahabad, is situated on the recently constructed Deoghat-Drummondganj metalled road.[1] It is on the slopes of the nearby Ramgarhwa hill that the artefacts are found in a fairly large number. The peripheral area of this hill is traversed by numerous small streams and *nalas*, which finally merge in the Belan, about 3-4 km. north. The hill is formed by shales of various shades and Vindhyan sandstone. However, the quartzite blocks are also found on the hill. The Middle Palaeolithic man of the region was selective in the choice of raw material for manufacturing his implements. He mostly preferred quartzite against sandstone. But, among the various types of quartzite, his first choice was the one which was fine-grained and dark-purple in colour. The medium and rough grained quartzite as well as sandstone come next in the order.

The two hundred and eighty-two artefacts, exhibiting marks of secondary working, form the group of finished and semi-finished tools (Figs. XXXI-XXXII). They are divisible into the following types.

TABLE 6

S. No.	Tool-type	Nos.	%
1.	Handaxe (broken)	1	0.3
	Simple side scraper		
2.	Straight	7	2.5
3.	Straighto-concave	2	0.7
4.	Concavo-convex	2	0.7
5.	Conical	1	0.3
6.	Concave	2	0.7

1. The location of the site has been given in Chapter III.

(*Contd.*)

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S. No.	Tool-type	Nos.	%
7.	Wavy	6	2.1
8.	Convex	32	11.4
	Total of simple side scrapers	52	18.4
	Double side scraper		
9.	Straight and concave sides	1	0.3
10.	Concave and convex sides	7	2.5
11.	Straighto-convex and convex sides	1	0.3
12.	Concavo-convex and denticulated sides	2	0.7
13.	Convex and denticulated sides	2	0.7
14.	Both sides convex	7	2.5
15.	Straight and convexo-concave sides	1	0.3
16.	Straight and straighto-concave sides	1	0.3
17.	Convex and concavo-convex sides	3	1.0
18.	Wavy and convexo-concave sides	1	0.3
19.	Straight and denticulated sides	1	0.3
	Total of double side scrapers	27	9.2
20.	Transverse scraper	8	2.9
21.	Angle scraper	5	1.7
22.	Double angle scraper	1	0.3
23.	Tanged double convex side scraper	1	0.3
24.	Flake with retouched top	5	1.7
25.	Flake with peripheral retouch	5	1.7
26.	Retouched nodule	20	7.2
27.	Notched tool	26	9.2
	Denticulate		
28.	Side denticulate on blade	4	1.4
29.	Side denticulate on flake	27	10.0
30.	Double side denticulate	13	4.6
31.	Top denticulate	5	1.7
32.	Top and double side denticulate	1	0.3
33.	Top and side denticulate	10	3.7
34.	Transverse denticulate	3	1.0
35.	Peripheral denticulate	1	0.3
	Total of denticulates	64	23.0

(*Contd.*)

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S. No.	Tool-type	Nos.	%
36.	Atypical borer on blade	2	0.7
37.	Knife	6	2.2
38.	Tanged flake	1	0.3
39.	Shouldered flake	2	0.7
	End scraper		
40.	End scraper on flake	7	2.5
41.	End scraper on blade	1	0.3
42.	End scraper with retouched sides	4	1.4
43.	Double end scraper	1	0.3
	Total of end scrapers	13	4.5
	Burin		
44.	Offset burin on retouch	2	0.7
45.	Burin on end scrapper	2	0.7
46.	Offset burin	2	0.7
47.	Alternate beaked burin	2	0.7
48.	Pseudo burin (*de Siret*)[1]	1	0.3
	Total of burins	9	3.1
49.	Retouched chip	15	5.3
50.	Partly retouched flake	18	6.4
	Grand Total	282	99.1

An overwhelming majority of the tools mentioned in the above table are made on flakes. The industry contains a high percentage of various types of denticulates and notched tools. Together they account for 32.2% of all the finished and semi-finished tools. Among the denticulates, a few shows micro-denticulation. In most of the other cases, they contain a series of big Clactonian notches and the ones formed by regular retouch. Moreover, there are some other tool-types also, which contain one or more notches, at times even continuous (*e.g.*, some double side scrapers). If they are also included in the group of denticulates and notched tools, the number will increase considerably. Equally important is the group of side scrapers, showing a large number of varieties. Simple and double side scrapers account for the majority, though a few transverse scrapers and angle scrapers also appear. Among all the types, the simple convex-scraper comes

1. Pseudo-burin (*de Siret*) is said to be the result of accidental fracture. Hence, not a finished tool-type. It has been included in the above table with a view to emphasising that it does appear occasionally in the Indian Palaeolithic industries. For details, see Bordes, F. *Typologie du Paleolithique*, etc., p. 32.

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out as a typical tool-type of the industry. The tools made on flat nodules of sandstone are particularly interesting, which have been referred to as retouched nodules in the above table. Mostly they are worked at a high angle, resulting in convex or denticulated working edges. End scrapers appear in the industry, but their percentage is very low. Same is the case with burins, among which most of the specimens fall under the broad category of offset burin. There is no point in the industry, but there are two atypical borers, both made on blades. The notches appearing on the either side of the borer-point are on the same surface and not on alternate surfaces, as generally found in the typical borers. Besides, the borer-point is also rather subdued. It is important to note that some of the tools have tang or shoulder near the base. The only handaxe of the industry is broken and small in size. Attention may also be drawn to the fact that a considerable number of chips is also retouched.

The technique involved in the manufacture of various artefacts may be divided into two, *viz.*, the blank-detaching technique, and that of the secondary working appearing on them. The following tables list the various classes of blanks and cores, the classification being based upon the techniques involved.

TABLE 7

S. No.	Core-type	Nos.	%
1.	Unprepared	4	8·5
2.	Unprepared dorsal but prepared st. pl.	5	10.6
3.	Partly prepared	2	4.2
4.	Prepared non-Levallois	6	12.8
5.	Levallois flake-core	23	49.0
6.	Core with prepared sides and with one big flake detached from dorsal	4	8.5
7.	Irregular and broken core	3	6.3
	Total	47	99.9

TABLE 8

S. No.	Blank-type	Nos.	%
1.	Unprepared flake	10	3.1
2.	Partly prepared flake	46	14.5
3.	Prepared non-Levallois	96	30.2
4.	Levallois flake	109	34.4
5.	Levallois point	2	0.6
6.	Core rejuvenating flake	6	1.8
7.	Blade	16	5.1
8.	Chip	17	5.4
9.	Undetermined	15	4.8
	Total	317	99.8

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Both the above tables show the dominant position of the Levallois technique in the industry. However, there is a marked difference between the proportions of the Levallois cores and the Levallois blanks. It is quite likely that some of the flakes were detached from the Levallois cores without further dressing the dorsal surface after taking off one or two flakes from them. Similarly, there are as many as sixteen blades in the industry, but there is not a single blade core.

Except in the case of the handaxe and most of the retouched flat nodules, the secondary working is in the form of small marginal retouch. In almost all the cases it is at medium-high angle, ranging from 60°-75°. The table given below shows the position of retouch appearing on various tool-types :

TABLE 9

S.No.	Tool-type	Dorsal	Ventral	Partly dorsal & Partly ventral	Alternate	Other[1]	Total
1.	Simple side scraper	24	11	17	—	—	52
2.	Double side scraper	10	3	6	—	8	27
3.	Other scraper etc.	10	4	7	2	2	25
4.	Knife	1	3	2	—	—	6
5.	End scraper	11	2	—	—	—	13
6.	Notch & denticulate	40	16	24	2	8	90
	Total	96	39	56	4	18	213
	Percentage	45.0	18.3	26.3	1.8	8.5	99.9

The above table indicates that most of the implements were either retouched on the dorsal or on the ventral surfaces. But, in a good number of specimens the retouch appears partly on the dorsal surface and partly on the ventral on the same side. It is also worthy of note that the alternate retouch is rare, and the bifacial retouch altogether absent.

From the point of view of shape and size, the artefacts do not show such uniformity. While most of the flakes are elongated in shape, a good number of them falls under the category of broad flakes. The large majority of the artefacts measures less than 79 mm. in length, but some are larger and a few measures even more than 100 mm. The same is the case with the width of the artefacts. The table (p. 81) indicates the length and the breadth of the components of the industry.

1. 'Other' means one side retouched in one way and the other in a different manner.

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TABLE 10

LENGTH[1]

Size-range (in mm.)	Finished tool	Part. ret. flake	Simple flake	Core	Total	%
0- 19	15	—	6	—	21	6.2
20- 39	68	3	20	—	91	25.8
40- 59	69	8	32	13	122	34.5
60- 79	28	5	21	19	73	20.3
80- 99	11	—	8	8	27	7.6
100-119	7	2	6	3	18	5.1
120 & above	—	—	—	1	1	.2
Total	198	18	93	44	353	99.7

BREADTH

0- 19	12	—	5	—	17	4.7
20- 39	73	7	30	15	125	34.9
40- 59	68	6	26	17	117	32.4
60- 79	41	5	22	7	75	20.7
80- 99	5	—	9	3	17	4.7
100-119	2	—	2	2	6	1.7
120 & above	—	—	—	2	2	.5
Total	201	18	94	46	359	99.6

Chainpura

Like Parsidhia, this factory site is also located on the slope of a hill named Lakhar, situated nearly 2 km. east of the village Chainpura. It is about five km. south-east from Parsidhia. A stream named Morhwa bounds the hill slope from the south and the west. The bed of this stream is strewn with gravel-spread, and there is a thick gravel deposit (nearly two metres) on the right bank. One blade core of chert was found from this gravel. Geologically the Lakhar hill resembles the Ramgarhwa Pahar. At this site also the artefacts (Fig. XXXIII) are made of quartzite, as well as sandstone.

1. The length of those specimens has not been measured which are broken length-wise, but they have been included in the table of breadth. The badly broken specimens have been left out altogether.

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The typological features of the industry are indicated in the table given below :

TABLE 11

S. No.	Tool-type	Nos.	%
	Simple side scraper		
1.	Convex	3	6.9
2.	Concave	1	2.3
3.	Straight	2	4.6
4.	Straighto-convex	1	2.3
5.	Concavo-convex	1	2.3
	Total of simple side scrapers	8	18.4
	Double side scraper		
6.	Convex and straighto-convex	1	2.3
7.	Straight and convex	2	4.6
8.	Convergent	1	2.3
	Total of double side scrapers	4	9.2
9.	Transverse scraper	1	2.3
10.	Flake with peripheral retouch	2	4.6
11.	Knife	3	6.9
12.	Atypical borer	1	2.3
13.	End scraper	5	11.5
14.	Retouched nodule	2	4.6
15.	Notched tool	4	9.3
	Denticulate		
16.	Side and top	1	2.3
17.	Top	1	2.3
18.	Peripheral	1	2.3
19.	Side	2	4.6
20.	Double side	1	2.3
21.	Transverse	1	2.3
	Total of denticulates	7	16.1
22.	Blade with retouched margin	1	2.3
23.	Partly retouched flake	5	11.5
	Grand Total	43	99.0

Typologically the industry is almost similar to that of Parsidhia. However, it differs from the latter on two grounds. Firstly, there is a better proportion of end scrapers, and, secondly, the denticulates and notched tools occur in a slightly smaller percentage.

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The technological characteristics of the industry are indicated in the following two tables.

TABLE 12

S. No.	Core-type	Nos.	%
1.	Unprepared dorsal & prepared sides	3	21.4
2.	Partly prepared	1	7.1
3.	Prepared non-Levallois	3	21.4
4.	Levallois flake-core	1	7.1
5.	Levallois point-core	1	7.1
6.	Disc core	1	7.1
7.	Irregular/broken core	4	28.6
	Total	14	99.8

TABLE 13

S. No.	Blank-type	Simple	Part. ret.	Finished tool	Total	%
1.	Unprepared flake	—	—	2	2	3.5
2.	Partly prepared flake	4	1	6	11	19.0
3.	Prepared non-Levallois flake	7	1	12	20	34.4
4.	Levallois flake	2	3	18	23	39.6
5.	Blade	1	—	1	2	3.5
	Total	14	5	39	58	100.0

As the above tables show, the Levallois cores form only a small proportion of all the cores, but, among the blank types, the Levallois flakes account for nearly 40% of the total. Thus, even from the point of view of blank-detaching techniques, the industry hardly differs from that of Parsidhia. The similarity between the two is also marked in the secondary work, appearing on the various artefacts. As usual, it is at medium high angle.

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TABLE 14

S. No.	Tool-type	Type of Retouch on Implements					
		Dorsal	Vent.	Part. Dor. Part. Vent.	Alter.	Other	Total
1.	Simple side scraper	5	2	1	—	—	8
2.	Double side scraper	1	—	—	—	3	4
3.	End scraper	4	1	—	—	—	5
4.	Knife	2	1	—	—	—	3
5.	Dent. & notch	5	1	4	—	1	11
6.	Others	2	1	1	—	—	4
	Total	19	6	6	—	4	35
	Percentage	54.2	17.1	17.1	—	11.4	99.8

As shown in the above table, not only the bifacial retouch is absent in the industry under discussion, but no specimen shows even alternate retouch. It may also be noted that the proportion of specimens containing retouch, partly from the dorsal surface and partly from the ventral, on the same side, is smaller in this industry than in that of Parsidhia.

The general shape and size of the artefacts are also not different from the earlier industry. The following table gives the measurement ranges of the length and breadth of the artefacts.

TABLE 15[1]

LENGTH

Size-range (in mm.)	Finished tool	Simple flake	Part. ret. flake	Core	Total	%
20-39	1	1	—	—	2	3.1
40-59	12	6	2	4	24	37.5
60-79	15	4	2	5	26	40.6
80-99	7	1	—	2	10	15.5
100-119	1	—	1	—	2	3.1
Total	36	12	5	11	64	99.8

(*Contd.*)

1. The broken specimens have not been included in this table.

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BREADTH

Size-range (in mm.)	Finished tool	Simple flake	Part. ret. flake	Core	Total	%
20-39	8	4	1	—	13	20.3
40-59	15	5	2	4	26	40.6
60-79	8	1	1	4	14	21.8
80-99	5	1	1	2	9	14.1
100-119	—	1	—	1	2	3.1
Total	36	12	5	11	64	99.9

Baithakwa

The factory site of Baithakwa is situated on an undulating surface, close to the north-eastern slope of the Ramgarhwa hill-range. The undulating landscape is the result of continuous erosion by the small *nalas* of the region. The actual site is nearly two kilometres south-west of the village Baithakwa, which is nearly seven kilometres north-west of Drummondganj on the Drummondganj-Deoghat road in Allahabad district. In respect of raw material as well as tool typology (Figs. XXXIV-XXXV), this industry closely resembles the Parsidhia and Chainpura industries.

A classification of the finished and semi-finished tools is given below in the form of table.

TABLE 16

S. No.	Tool-type	Nos.	%
	Simple side scraper		
1.	Convex	6	9.2
2.	Straight	5	7.4
3.	Concavo-convex	2	3.0
	Total of simple side scrapers	13	19.6
	Double side scraper		
4.	Straight and concave	2	3.0
5.	Straight and convex	1	1.5
6.	Convergent	1	1.5
	Total of double side scrapers	4	6.0

(*Contd.*)

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S. No.	Tool-type	Nos.	%
7.	Transverse scraper	2	3.0
8.	Angle scraper	1	1.5
9.	End scraper	2	3.0
10.	Retouched nodule	7	10.7
	Denticulate		
11.	Top	3	6.0
12.	Side	10	15.3
13.	Double side	3	4.5
14.	Peripheral	4	6.0
	Total of denticulates	20	31.8
15.	Notched flake	1	1.5
16.	Partially retouched flake	14	21.4
17.	Partially retouched blade	1	1.5
	Grand Total	65	100.0

The tool-kit of the industry, as is clear from the above table, shows marked resemblance with the other two Middle Palaeolithic industries of the Belan valley, discussed earlier.

As regards the blank detaching techniques, the industry once again follows the preceding two industries. However, the Levallois technique was more extensively used in this case than the other two.

TABLE 17

S. No.	Core-type	Nos.	%
1.	Partially prepared core	7	21.8
2.	Core with prepared sides	5	15.6
3.	Levallois flake-core atypical	2	6.2
4.	Levallois flake-core	16	50.0
5.	Blade core	1	3.1
6.	Undetermined	1	3.1
	Total	32	99.8

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TABLE 18

S. No.	Blank-type	Simple	Part. ret.	Finished tool	Total	%
1.	Unprepared flake	—	—	1	1	1.0
2.	Partially prepared flake	5	1	3	9	9.9
3.	Prepared non-Levallois flake	5	8	23	36	39.5
4.	Levallois flake	13	5	21	39	42.8
5.	Flake from blade core	1	—	—	1	1.0
6.	Blade	2	1	—	3	3.2
7.	Undetermined	—	—	2	2	2.2
	Total	26	15	50	91	99.5

Though the retouch appearing on the various implements follows the same general pattern, yet it is noteworthy that the number of specimens retouched partly from the dorsal surface and partly from the ventral, on the same side, is comparatively larger in this industry than in the preceding two.

TABLE 19

S. No.	Tool-type	Dorsal	Ventral	Part D. & V.	One D. the other V.	One D. other V.D.	Total
1.	Side scraper	6	3	7	2	2	20
2.	End scraper	2	—	—	—	—	2
3.	Dent. & notch.	9	2	10	—	—	21
	Total	17	5	17	2	2	43
	Percentage	39.5	11.6	39.5	4.6	4.6	99.8

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The table given below indicates the length and breadth ranges of the artefacts.

TABLE 20[1]

LENGTH

Size-range (in mm.)	Scraper	Denticule	Part. ret.	Simple flake	Core	Total	%
0-19	—	—	—	—	—	0	0.0
20-39	1	—	—	1	—	2	1.8
40-59	7	5	2	4	1	19	17.2
60-79	7	9	4	9	2	31	28.1
80-99	7	1	2	3	6	19	17.2
100-119	3	2	2	2	18	27	24.5
120 & above	3	3	—	3	3	12	10.9
Total	28	20	10	22	30	110	99.7

BREADTH

0-19	—	—	—	—	—	0	0.0
20-39	6	3	1	2	—	12	10.9
40-59	8	4	2	10	2	26	23.6
60-79	5	5	6	3	9	28	25.4
80-99	2	5	1	5	3	16	14.5
100-119	3	3	—	1	7	14	12.7
120 & above	4	—	—	1	9	14	12.7
Total	28	20	10	22	30	110	99.8

It is evident from the above table that the artefacts of this industry are, in general, slightly bigger than those of Parsidhia and Chainpura. There are only two specimens, which measure between 20 and 39 mm. in length; all the others are longer.

Siddhpur

The site is a triangular shaped valley of Bankesiddh, closed by two hill ranges from three sides with an opening towards the north-east.[2] The eroded undulating surface of the valley is littered with hundreds of thousand of artefacts. Unfortunately, in spite of the site being so rich in artefacts, the collection from it can hardly be used for detailed techno-typological analyses, since the Middle Palaeolithic tools are

1. The table does not include the broken specimens.
2. For the location and other details of the site, see Chapter II.

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generally found mixed with the Upper Palaeolithic ones on the surface. However, the potentialities of the site are obvious, and extensive excavations may reveal a separate horizon of the Middle Palaeolithic industry. We believe that the artefacts of this phase are associated with the gravel deposit revealed by the cliff-sections of the *nalas*. A small scraping at the site indicated that the gravel-sheet covered almost the entire valley.[1]

Like the other Middle Palaeolithic sites discussed earlier, evidently this one also is a factory site. But, the industry breaks the monotony of the coarse rocks like quartzite and sandstone, and all the artefacts at this site are made of finer stones of the quartz group like chert, chalcedony, opal and agate. As is the case generally with the factory sites, a large majority of the artefacts is comprised of simple flakes, chips, flaked nodules, and finished and semi-finished cores.

As mentioned earlier, it is a mixed industry, and hence, it is not considered desirable to give statistical details of its techno-typological characteristics. It must be emphasised, however, that typologically it does not differ basically from the Middle Palaeolithic industries of the Belan region. Among the tool-types, a large variety of simple and double side scrapers, as well as numerous denticulates and notched tools, embellish this industry also. In fact, some of the best examples of denticulates can be seen in this industry (Fig. XXXVI). These implements contain Clactonian notches, as well as usual notches, made by fine retouch. The specimens bearing micro-denticulation are also not wanting. Some examples of end scrapers, burins and knives are also present. The last named type of this industry is particularly noteworthy. The thicker side of this implement is either the result of a particular manner of core preparation, or formed by natural surface of the nodule. It appears that the cores were particularly prepared for the purpose of detaching such flakes as would have one thick side and the other a sharp one.[2] The cross-section of these flakes is usually like a scalene triangle. Since the material used for manufacturing the implements is fine-grained, the retouch on them is neater and better.

It is difficult to give exact proportions of the various blank-detaching techniques used in the industry. It may be mentioned that all the core and blank types, noticed in the Middle Palaeolithic industries of the Belan region, are present in this industry also. But most of the cores and blanks belong to the category of unprepared, partially prepared and prepared non-Levallois. It does not mean that the Levallois technique was unknown to the Middle Palaeolithic man of this region. Some classical

1. The stratigraphy of the site has been discussed in Chapter II.
2. We are not in a position to give further details of this technique at present, since the study is not yet complete. However, it may be mentioned that the evidence for this technique is also present in the Middle Palaeolithic industry of Jamalpur, District Monghyr, Bihar. For details see Pant, P.C. and Jayaswal, V., Jamalpur : A Typological Variant within the Middle Palaeolithic Complex of India', to be published shortly in the *Puratattva*.

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Levallois cores, both for flakes and points, and corresponding blanks, have been discovered from this valley. It appears that this complex blank-detaching technique was used rather sparingly. Incidently, the evidence confirms the tentative suggestion of Jayaswal that the Levallois technique was more extensively used in those Middle Palaeolithic industries which adopted coarse-grained material, like quartzite, for manufacturing implements than in those in which the raw material was fine grained.[1]

The site of Siddhpur was also visited earlier by G. R. Sharma[2] and Bridget Allchin.[3] The latter collected 266 artefacts, which included cores for flakes, blades and blade-flakes and their corresponding products. She did not attempt any detailed typological screening of the material. Among the finished tool-types she mentioned backed blades, scalene triangles, and convex and hollow scrapers.

Other Finds

Artefacts of the Middle Palaeolithic phase have been reported from numerous other localities of Southern Uttar Pradesh. They come mostly from the gravel deposits of rivers and *nalas*, comparable in many respects with the gravel II of the Belan and other streams, and the loose gravel spreads. In almost all these cases, the collections are rather small. Besides, reference may also be made to a few factory sites, occurring in various parts of Southern Uttar Pradesh.

Among the three terraces at Bariyari, on a small tributary of the Yamuna, G.R. Sharma claimed to have found a mixed industry in the terrace 2.[4] Some of the artefacts are said to be "flakes and flake-tools of the Levellois technique",[5] recalling the Middle Palaeolithic tool tradition. R.V. Joshi located half a dozen sites with "tools of series II" along the river Betwa, between Deogarh and Moth, in the Jhansi district.[6] The stratigraphic evidence was, however, not very clear. In the Singrauli basin in Mirzapur district, R.K. Verma noticed a site on the Rihand near Gaharwargaon Ghat, which yielded both Series I and II tools.[7] At a number of places on the Dhasan, Rameshwar Singh picked up some Middle Palaeolithic artefacts, mostly from the loose gravel bed.[8] However, at Gonchi he noticed a cemented gravel, which yielded a fossil premolar and a number of Series II tools. Nisar Ahmad reported a few

1. Jayaswal, V., 'A Note on the Influence of Raw-Material on the Blank-detaching Techniques', *Puratattva*, No. 6, 1972-73, pp. 64-70.
2. *I.A.R.*, 1955-56, p. 4.
3. Allchin, Bridget, 'Siddhpur and Barkachha : Two Stone Age Factory Sites in Uttar Pradesh', *Perspectives in Palaeo-anthropology*, (ed.) Ghosh, A.K., pp. 235-248.
4. *I.A.R.*, 1955-56, p. 4.
5. *Ibid.*
6. *Ibid.*, 1959-60, p. 46.
7. *Ibid.*, p. 48.
8. *Ibid.*, 1960-61, p. 35.

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'Middle Stone Age tools' from Chopan, on the Son in Mirzapur district.[1] Similar artefacts were found also by us at three localities on the Son, *viz.*, Chopan, Kota and Bijaura.[2] At the last named site, they were recovered from an *in situ* gravel deposit.[3] During our explorations in the Banda district in 1961, Middle Palaeolithic artefacts were found at Bankat and Sitapur on the Paisuni, and Durendi on the Ken.[4] Similar tools were picked up by us also from the loose gravel bed of the Baghain near Kalinjar in the same district recently.[5] It is interesting to note that the artefacts found in the gravel spread or the *in situ* gravels are, in majority of the cases, made of fine-grained crypto-crystalline silica. Though it is not easy to determine the exact typological nature of the specimens due to heavy rolling and thick patina, it may be generally said that they show affinity with the Nevasian of the peninsular India.

The factory sites have been located mostly in the Belan region of the Mirzapur and Allahabad districts.[6] Invariably they are situated on the gentle slopes or the foothills of the Vindhyan system. Some of them are Batuabir, Deoghat, Atreji, Murawa, Murali, Khuntabir, etc. At all these places, finished and semi-finished implements, blanks and cores in various stages of manufacture, as well as numerous chips have been found. Techno-typologically the industries closely follow those of Parsidhia, Chainpura and Baithakwa. It is rather intriguing that at all these sites the chief raw material is fine to medium-grained quartzite, followed by sandstone, while the gravel II of the rivers Belan and Seoti yielded tools of both quartzite and crypto-crystalline silica. Wherefrom did the latter reach the gravel deposits is at present shrouded in mystery. In future, probably, when the whole area is more thoroughly examined, the mystery may be solved.

Resume

The above discussion brings out the techno-typological features of the selected Middle Palaeolithic industries of Southern Uttar Pradesh. All of them are collections from the surface, and have been grouped under the head Middle Palaeolithic on account of their techno-typological features. The stratigraphical position of this phase is revealed by the cliff-sections of the Belan and the Seoti. Unfortunately, the gravel deposits do not yield sufficient number of artefacts, and, for studying the exact nature of this phase, one has no other alternative but to rely upon the evidence provided by factory sites.

1. *Ibid.*, 1962-63, p. 37.
2. Narain, A.K. and Pant, P.C., 'A Summary Account of Archaeological Explorations in East U.P.—1962-63', *Bharati*, No. 8. Part I, p. 128.
3. The section has been described in the Chapter II.
4. Pant, P.C., 'Some Lithic-Tool Industries of Banda', *Bharati Supplements*, No. 2, pp. 11-22.
5. In 1974-75, when we extensively explored Banda, Hamirpur and Jhansi districts.
6. *I.A.R.*, 1968-69, p. 34, and 1969-70, p. 36.

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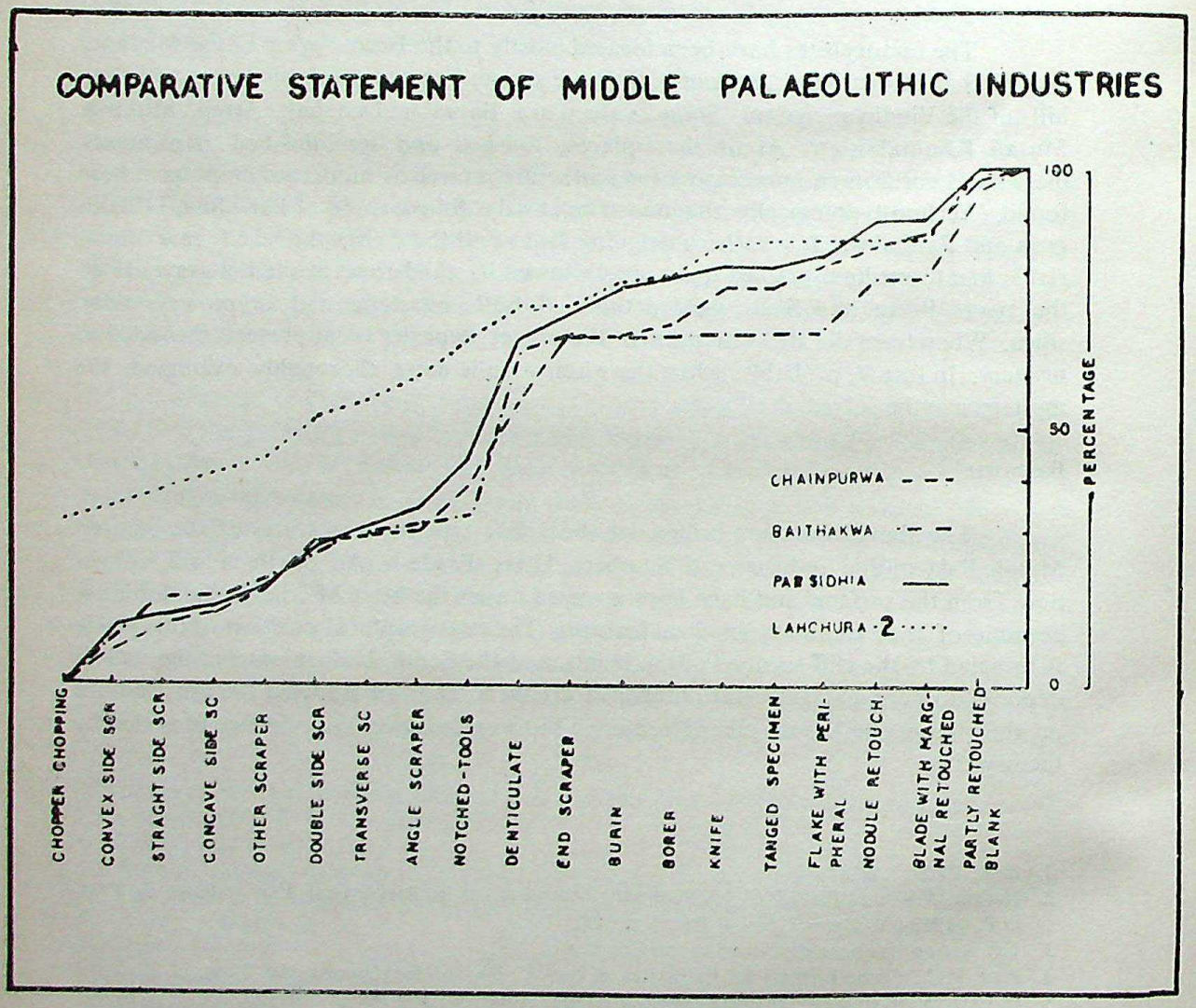
If techno-typology of the industries is accepted as the sole guide, we have two clear sets of industries in the region of our study. Lahchura-2 belongs to the pebble-tool tradition, perhaps directly derived from the similar industries of the preceding phase, and marking a stage of evolution. In this respect, it can be compared with the Late Soan industries of the Potwar region. It is characterised by the occurrence of a good proportion of pebble-tools (32.5%) and various types of side scrapers (30.2%). In the second set of industries may be included those coming from Parsidhia, Chainpura, Baithakwa and Siddhpur. They all contain almost identical tool-kit, with only marginal differences in the proportions of the various types. But, from the point of view of blank-detaching technique, the Siddhpur industry distinguishes itself from the rest. The Levallois technique, though known, was not so extensively used in this



Graph 3

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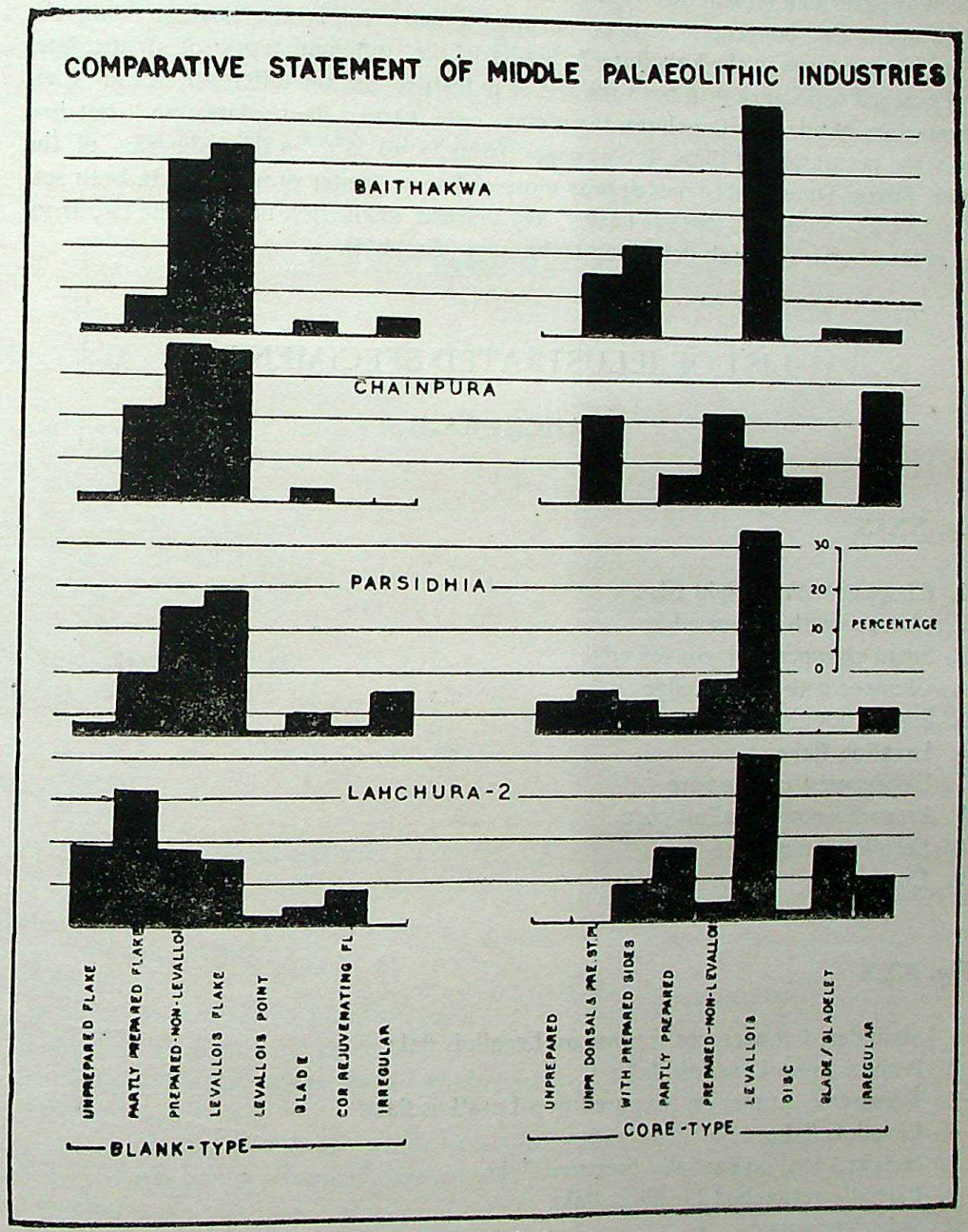
industry as in the others. It is worthwhile to recall here that the distinction between the La Quina and La Ferrassie industries of the Charentien of France is also based upon the presence or near absence of the Levallois element in them and not on the basis of their tool typology.[1]



Graph 4

1. Bordes, F., *The Old Stone Age*, pp. 101-102.

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The distinction between the above mentioned two sets of industries is very clear (Graph 3). Firstly, it is the appearance and absence of the pebble-tools. Though various types of side scrapers characterise both, it is the simple convex scraper which appears as a typical tool-type of the industries of the Peninsular facies. On the other hand, the convergent scraper occupies a more important position than the other scraper-types in the Lahchura-2. Similarly, the different types of denticulates and notched tools appear in both the sets of industries, but the difference lies in their proportion. While the Lahchura-2 contains only 14.5% denticulates and notched tools, the percentage of these tools ranges from 25 to 35% in the industries of the other facies. Other tool-types appear more or less in similar proportions in both sets of industries. Similarly, there is hardly any marked distinction between the two from the point of view of blank-detaching techniques (Graph 4).

LIST OF ILLUSTRATED SPECIMENS

LAHCHURA-2

Fig. XXIX

1. Chopper with straight edge
2. Chopper with convex edge
3. Small chopper with convex edge
4. Chopper with convex edge
5. Small chopping-tool
6. Levallois flake
7. Unprepared pebble-core
8. Prepared non-Levallois core
9. Levallois point-core
10. Core-rest

Fig. XXX

1. Shouldered convergent scraper on Levallois flake
2. Prepared non-Levallois flake
3. Transverse scraper on prepared non-Levallois flake
4. Levallois flake
5. Notched tool on partially prepared flake
6. Partially retouched Levallois flake
7. Side-denticulate
8. Concave side scraper

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9. Partly prepared flake with partial retouch
10. Single stroke axial burin on flat pebble
11. Unfinished blade-core
12. Prepared non-Levallois flake with partial retouch
13. Unprepared flake with partial retouch
14. Side-denticulate on prepared non-Levallois flake
15. Offset burin on retouch (?)
16. Offset dihedral burin
17. Small Levallois flake with partial retouch

PARSIDHIA

Fig. XXXI

1. Double side scraper with alternately retouched sides
2. Double side-denticulate
3. Double side-denticulate
4. Double side-denticulate
5. Double side-denticulate
6. Double side-denticulate
7. Levallois core-rest
8. Double side-denticulate
9. Top-denticulate

Fig. XXXII

1. Flake with peripheral retouch
2. Convex side scraper with retouch partly from the dorsal and partly from the ventral surface
3. Convex side scraper
4. End scraper
5. Straight side scraper on Levallois point
6. Top-denticulate on a Levallois flake
7. Double convex side scraper on a Levallois flake
8. Levallois core-rest
9. Convergent scraper with alternately retouched sides
10. Pseudo-burin with a retouched side (*de Siret*)
11. Levallois core

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12. Atypical borer on blade
13. Levallois flake

CHAINPURA

Fig. XXXIII

1. Levallois flake with partial retouch
2. End scraper with retouched side
3. Double side scraper
4. Side-denticulate (micro-denticulation)
5. Angle scraper
6. Convexo-concave side scraper
7. Atypical borer with denticulated side
8. Levallois core-rest
9. Convexo-concave side scraper on Levallois flake

BAITHAKWA

Fig. XXXIV

1. Convex side scraper
2. Double denticulate on Levallois flake
3. Convex side scraper on Levallois flake

Fig. XXXV

1. Side-denticulate
2. Transverse scraper
3. Partially retouched blade
4. Levallois core
5. Core with prepared sides

SIDDHPUR-1

Fig. XXXVI

1. Atypical point with a denticulated side
2. Atypical borer
3. Broken blade

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4. Double side-denticulate
5. Double side-denticulate
6. Peripheral denticulate
7. Top-denticulate
8. Side-denticulate (micro-denticulation) with truncation
9. Side-denticulate with one thick side (knife)
10. Knife
11. Primary flake with one thick side
12. Side-denticulate
13. Levallois core

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CHAPTER V

The Upper Palaeolithic

It is during the last few years that somewhat definitive evidence has come up from more than one region of the Indian sub-continent to establish the existence of an Upper Palaeolithic phase. Southern Uttar Pradesh is one such region, which has almost conclusively determined the stratigraphical and chronological position of this hitherto lesser known period of Indian Prehistory. The techno-typological personality of the culture or cultures as well as their distribution are, however, yet to be established. An attempt is being made in the following pages to examine these two aspects of the Upper Palaeolithic of Southern Uttar Pradesh.

During the middle sixties of this century, various Quaternary deposits were found on the banks of the river Belan and its tributary the Seoti, with a definite evidence for a third gravel containing blades and tools made on them.[1] The credit for this startling discovery goes to G.R. Sharma and his co-workers at the Allahabad University. The industry associated with the third gravel was termed 'Upper Palaeolithic' by Sharma.[2] Subsequently, he also found some factory sites of the culture on the foot-hills of the Belan region.[3] The two radio-carbon dates of the shells from the third gravel are 17765 B.C. (TF 1245) and 23840 B.C. (PRL 86).[4]

As early as in 1961, we explored some parts of the Banda district and located a few industries, which, from the point of view of techno-typology, could neither be assigned to the Middle Palaeolithic nor to the microlithic tradition.[5] Since their separate identity could not be established on stratigraphical grounds, they were not termed Upper Palaeolithic. However, a claim was made to the effect that these assemblages should be assigned a separate techno-typological identity, and in this

1. *I.A.R.*, 1966-67, pp. 35-38.
2. *Ibid.*, and Sharma, G.R., 'Stone Age in the Vindhyas and the Ganga Valley', *Radiocarbon and Indian Archaeology*, (ed.) Agrawal & Ghosh, p. 108.
3. *I.A.R.*, 1968-69, pp. 33-35.
4. Sharma, G.R., *et al.*, *Beginning of Agriculture*, p. 3.
5. Pant, P.C., 'Some Lithic-Tool Industries of Banda', *Bharati Supplements*, No. 2, p. 28.

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capacity, they formed a sort of bridge between the typical Middle Stone Age industries and those assignable to the Late Stone Age.[1] These sites were revisited during our field trip of 1974-75, and fresh collections made. Besides, many new industries were also found in Banda district, showing striking similarity with those found earlier.

With a view to understanding the Palaeolithic sequence and the nature of industries assignable to its various phases, we also explored between 1970 and 1977 parts of the Belan and the Seoti, as well as the surrounding areas, and made sizeable collections from the numerous factory sites of the region. The blade industries found from these sites of the Belan region, as well as those of Banda, however, posed a problem that all of them contained some bladelets and microliths. The latter appeared generally in small proportions, and it was difficult to determine whether these bladelets and microliths formed part of the blade industries. This necessitated their comparison and correlation with the industry of the gravel III of the Belan and the Seoti, already dated by the radio-carbon method. With this objective in mind, the third gravel of the Seoti was subjected to two scrapings near the village Daiya. Though the number of artefacts found *in situ* was not very large, yet we could establish the point that bladelets and a limited number of microliths were indeed the essential feature of the industry. One of the microliths found in the gravel was almost a triangle, comparable to similar tools found in Mesolithic industries. It was heartening to note that blade industries found in the Belan region and also those of the Banda district generally agreed with that derived from the third gravel by excavation, though many of them also exhibited some distinguishing techno-typological features. The association of bladelets and microliths with the Upper Palaeolithic blade industries has been established also in Maharashtra[2] and Andhra Pradesh.[3] It may be mentioned that many of the microliths appear to be geometric in form.[4] Looking at the evidence coming from the Belan region (particularly the date of the gravel III), and also from the other parts of the sub-continent, the blade industries found by us in different parts of Southern Uttar Pradesh may be tentatively assigned to the Upper Palaeolithic phase.

Upper Palaeolithic industries have been found so far in Mirzapur, Allahabad and Banda districts of the region under discussion. Besides, there is a possibility of the existence of similar industries in the Karamnasa valley in the Naugarh area of the Chakia *tahsil* of Varanasi district, where, more than a decade ago, we found a

1. *Ibid.*
2. Compare the phases IIC and D of Patne in Jalgaon district. The results of the excavation, conducted by Shri S.A. Sali, have been briefly reported by Sankalia, H.D., in *Prehistory and Protohistory*, etc., pp. 226-228. In Fig. 55m of the same publication, there are drawings of the six 'blade tools' of Patne IIC. In fact, four of them (from 9 to 12) are bladelets.
3. See Murty, M.L.K., 'Blade and Burin and Late Stone Age Industries around Renigunta, Chitoor district', *Indian Antiquary*, Third Series, Vol. IV, pp. 106-128. Attention may be drawn to Fig. 18, tool Nos. 30 and 34 particularly.
4. Compare the 'triangles' and 'trapezes' under the head 'Backed Pieces' of Murty, *Ibid.*, p. 112.

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few sporadic blades and long bladelets. However, no actual site could be located so far. The Hamirpur, Jhansi and Lalitpur districts have not yielded any Upper Palaeolithic industry till now. The industries of this phase appear to be concentrated mainly in the south-western part of the Mirzapur district and the adjoining Meja *tahsil* of the Allahabad district. They are found in the gravel deposits of the rivers Belan and Seoti, and from the factory sites on the slopes and the foothills, and the numerous rock-shelters, which are mostly located on the flat tops of the Vindhyan range. Besides, somewhat similar factory sites were also discovered by us in 1962-63 around a tiny hill-range named Daini, nearly five kilometres south-west of Dudhi in Mirzapur district. Some more tools were collected recently from the Dudhi sub-division.[1] During the same field-season, we also located more than a dozen rock-shelters, associated with blade-bladelet industries, in the Saudag forest, near the villages Baraila and Khuraila, about twenty kilometres south-east of Robertaganj in Mirzapur district. At that preliminary stage of study, these were described tentatively as microlithic industries.[2] In district Banda, the Upper Palaeolithic industries have been found from the numerous factory sites located in the slopes and foot of hills, lying south of Karwi and Naraini towns.[3] The representative sites of the two regions are Ainchwara and Kalinjar respectively, described in detail elsewhere in this chapter. The hill range, starting from south-west of Chitrakoot and continuing upto Manikpur, was found to be particularly rich in this respect, and a number of factory sites, like Hanumangarhi, Siddhpur, Kolgadhaiya, Marjadpur, Khoh, Rihutia, Ainchwara, Ahirpurwa, etc., were located. A few rock-shelters were also noticed in this area, but no industry was found associated with them.

The factory sites are generally very rich in artefacts. Since many of them have yielded several thousand specimens, it is not possible to give detailed techno-typological analysis of every industry. Hence, the cultural material from a few selected sites only is being presented in the following pages. Three of the six industries described below were obtained by exploratory soundings. They are the Daiya industry found *in situ* in the Seoti gravel, the industry obtained from the lowermost stratum of the rock-shelter at Lahariadih, and that of the Bankesiddh valley near Siddhpur. All the remaining three are surface collections, made from factory sites.

Daiya

Nearly three kms. south of the village Daiya there is evidence for well-preserved gravel III in the cliff-section of the right bank of the Seoti. The place selected for two small scrapings of this gravel deposit[4] lies nearly two and a half kilometres

1. *I.A.R.*, 1970-71, p. 36.
2. Narain, A.K. and Pant, P.C., 'A Summary Account of Archaeological Explorations in East U.P. 1962-63', *Bharati*, No. 8, Part I, pp. 128-132.
3. Most of them were discovered by us during our explorations in the session 1974-75.
4. For details of stratigraphy, see Chapter II.

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upstream from the confluence of the Seoti and the Belan. The scrapings were intended to find artefacts *in situ*. This objective was fairly achieved, and ninety-three artefacts were excavated from the gravel deposit. All of them, barring a few, which are of quartzite, are made of fine-grained material of the quartz group, like chert, chalcedony, opal and agate.

The artefacts (Fig. XXXVII) acquired from this exploratory digging present a rather unusual picture, though not entirely unexpected. The probings provide sufficient evidence to conclude that, besides some blades and flakes, the Upper Palaeolithic industries of this region not only contain a sufficient number of bladelets, but a small quantity of microliths as well.

Out of a total of ninety-three artefacts, twenty contain marks of secondary working. They belong to the following types.

TABLE 1

S. No.	Tool-type	Nos.	%
1.	Triangle—atypical	1	5.0
2.	Backed bladelet	1	5.0
3.	Partially backed bladelet with marginal retouch	1	5.0
4.	Federmesser	1	5.0
5.	End scraper	1	5.0
6.	Single-stroke axial burin	1	5.0
7.	Transverse burin	3	15.0
8.	Offset burin on proximal end	1	5.0
9.	Obliquely truncated bladelet with marginal retouch	1	5.0
10.	Truncated blade	1	5.0
11.	Notched blade	2	10.0
12.	Denticulated bladelet (side)	2	10.0
13.	Blade/bladelet with marginal retouch	2	10.0
14.	Convex side scraper	1	5.0
15.	Partially retouched blade	1	5.0
	Total	20	100.0

It is interesting to note that out of the twenty specimens of the above table, nine are blades, eight bladelets, and three flakes. The first three of them may be grouped under the head microlith. The five burins of the industry contain only one facet each, and they are not so well made as one generally finds in the Upper Palaeolithic industries of Europe, North Africa and West Asia. It is also noteworthy that denticulated and notched tools make their appearance. Two tool-types are typical of

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the industry. They are Federmesser (pen-knife) and truncated blade-bladelet. The Federmesser has one convex backed side, a result of the careful retouch covering a part of the base as well.

TABLE 2

S. No.	Blank-type	Simple	Part. ret.	Finished tools	Total	%
1.	Unprepared flake	3	—	—	3	3.8
2.	Partially prepared flake	4	—	1	5	5.19
3.	Prepared non-Levallois flake	6	—	—	6	7.79
4.	Levallois flake	2	—	1	3	5.19
5.	Flake from blade core	4	—	1	5	6.49
6.	Core rejuvenating flake	1	—	—	1	1.29
7.	Blade	5	1	9	15	19.04
8.	Bladelet	18	—	8	26	33.76
9.	Chip	13	—	—	13	16.88
	Total	56	1	20	77	99.43

TABLE 3

S. No.	Core-type	Nos.	%
1.	Blade/bladelet-core with two platform (prismatic)	2	12.5
2.	Blade/bladelet-core with one platform (prismatic)	2	12.5
3.	Unfinished blade-core	3	18.75
4.	Partially prepared flake-core	3	18.75
5.	Irregular and borken core	6	37.5
	Total	16	100.00

From the point of view of blank-detaching techniques, it is essentially a blade-bladelet industry. This is evident particularly from the core types. Most of the flakes might have been detached during the process of the preparation of blade-bladelet-cores.

All retouched specimens show unifacial retouching. Except for one denticulated bladelet, which is retouched on the ventral, all are retouched on the dorsal surface. The following table gives the length and breadth ranges of the various artefacts of the industry.

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TABLE 4[1]

LENGTH Size-range (in mm.)	Flake	Blade	Bladelet	Core	Total	%
10-19	8	—	6	2	16	29.6
20-29	8	2	7	7	24	44.4
30-39	5	4	3	—	12	22.2
40-49	1	—	—	1	2	3.7
Total	22	6	16	10	54	99.9
BREADTH						
0-12	—	—	16	4	20	37.0
13-19	13	6	—	5	24	44.4
20-29	6	—	—	1	7	12.9
30-39	3	—	—	—	3	5.5
Total	22	6	16	10	54	99.8

The above table shows that, with the exception of two, which measure upto 50 mm. in length, all the artefacts are shorter than 40 mm. Thus, long blades and bladelets do not form a characteristic feature of this industry.

It may be recalled that a bone harpoon (or a human figure ?) was also found sometime ago from the gravel III, near the village Daiya.[2] The discovery of this bone implement undoubtedly adds to the Upper Palaeolithic character of the industry.

Lahariadih

The site is located in and around a rock-shelter facing east, on a sandstone hillock on the top of a hill range, locally known as *Mura* hill, lying south of Drummondganj in the district Mirzapur.[3] In fact the whole range, the southern part of which is known as Gurjhia, is full of numerous rock-shelters of various sizes. Many of them are fairly large and contain primitive paintings of different phases, executed in red and chocolate pigments. Moreover, quite a few of them have also preserved deposits of earth and rock debris containing implements.

After probing the cliff-section of the Belan and the Seoti, particularly that part, which contained Upper Palaeolithic material, it was thought advisable to locate the habitation areas of the Upper Palaeolithic man. The cultural material found inside

1. The table does not include the broken specimens.
2. *I.A.R.*, 1970-71, p. 36 and Plate LIX, B.
3. For the details of the location of the site, see Chapter II.

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and outside the rock-shelters compared well with the tool-kit obtained from the Belan-Seoti deposits. Yet, the collections from the surface lacked stratigraphical context. With a view to removing this lacuna, and finding some material in the stratigrapical context, therefore, two small trenches, each measuring 2 × 1.5 metres, were laid in the rock-shelter nearest the national highway.[1] The earth in the whole deposit is uniformly loose and blackish in colour. The three layers were marked mainly on the basis of the cultural material yielded by them. It is worthwhile to note here that the culture-sequence found at this shelter is, to a large extent, similar to that found at Lekhahia,[2] Beghaikhor[3] and Morhana pahar.[4] However, no metal was found in any of the layers in our rock-shelter.

The industry acquired from the lowermost stratum may be tentatively regarded as Upper Palaeolithic, since many of its techno-typological characteristics are common with the assemblage of the Belan-Seoti gravel. The industries obtained from the upper strata do not come in the purview of the present study. The raw material used for manufacturing tools is mostly crypto-crystalline silica, but quartzite and sandstone have also been utilized to a limited extent.

The typological classification of the tool-kit (Figs. XXXVIII & XXXIX) of Lahariadih is given below :

TABLE 5

S. No.	Tool-type	Nos.	%
1.	Obliquely truncated backed bladelet	2	2.19
2.	Obliquely truncated bladelet	5	5.49
3.	Backed bladelet	13	14.28
4.	Lunate	9	9.89
5.	Micro-gravette point (two atypical)	7	7.69
6.	Point on bladelet (obliquely worked edge)	4	4.39
7.	Borer on flake	1	1.09
8.	End scraper on bladelet	2	2.19
9.	Round scraper on core rejuvenating flake	1	1.09
	Burin		
10.	Offset burin (flake)	1	1.09
11.	Axial burin (flake)	2	2.19

(*Contd.*)

1. The stratigraphy of the site has been described in the Chapter II.
2. Sharma, G.R., in *Indian Prehistory—1964*, (ed.) Misra and Mate, pp. 76-79.
3. Verma, R.K., in *Ibid.*, pp. 73-75.
4. *Ibid.*

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S.N.	Tool-type	Nos.	%
12.	Single stroke axial burin with truncated base	1	1.09
13.	Axial burin on retouch	1	1.09
14.	Offset burin on proximal end	2	2.19
	Total of burins	7	7.69
15.	Backed blade	1	1.09
16.	Blade/bladelet with one retouched side[1]	6	6.78
17.	Bladelet with both retouched sides	1	1.09
18.	Flake with retouched top	1	1.09
19.	Angle scraper	1	1.09
20.	Simple concave side scraper	1	1.09
21.	Transverse scraper	1	1.09
	Notched and denticulated tools		
22.	Notched flake	2	2.19
23.	Notched blade	1	1.09
24.	Notched bladelet	1	1.09
25.	Bladelet with denticulated back	1	1.09
26.	Denticulated bladelet	2	2.19
27.	Blade with micro-denticulation	3	3.29
28.	Denticulated backed blade/bladelet with retouched margin (ventral)	2	2.19
29.	Denticulated flake	2	2.19
	Total of denticulated and notched tools	15	16.42
30.	Partially retouched flake	10	10.98
31.	Partially retouched bladelet	3	3.29
	Grand Total	91	99.84

It is evident from the above table that the majority of the tools of the industry are made on bladelets. Some of them may be termed true microliths. Seven Micro-Gravette points (including two atypical) are particularly interesting. On the whole, backed specimens form a dominant characteristic of the industry. Among the burins, both axial and offset types occur almost in equal proportion. Notched and denticulated tools made on flake, blade and bladelet appear in a comparatively smaller proportion. Quite a few blades and bladelets show marks of marginal retouch at a low angle. It may be of particular interest to note that this type of retouch very often appears on the ventral surface. The socalled Epi-palaeolithic industry of Chopani-Mando[2] seems to compare favourably with that of Lahariadih. Though this author had no opportunity

1. Five out of six are retouched on the ventral surface.
2. Sharma, G.R., *et al.*, *Beginnings of Agriculture*, p. 33 ff.

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to make a first hand study of the material, and the report also, unfortunately, does not contain a detailed typological screening of the tool-kit, yet it is fairly clear from the illustrations that the Chopani-Mando industry also have some typical examples of Micro-Gravettes.[1]

The blank group comprises flakes, blades, bladelets and chips. The following tables record the classification of blanks and cores.

TABLE 6

S.No.	Blank-type	Simple	Part. ret.	Finished tool	Total	%
I.	*Flake*					
1.	Unprepared (Primary)	7	2	1	10	1.79
2.	Partially prepared	8	3	2	13	2.33
3.	Levallois	5	1	3	9	1.61
4.	Core-rejuvenating	9	—	3	12	2.15
5.	From blade-core[2]	6	3	3	12	2.15
6.	Undetermined	6	1	1	8	1.43
	Total	41	10	13	64	11.49
II.	*Blade & Bladelet*[3]					
7.	Blade	49	—	10	59	10.59
8.	Bladelet	126	3	55	184	33.21
	Total	175	3	65	243	43.62
III.	*Chip*	250	—	—	250	44.88
	Grand Total	467	13	78	557	99.99

Bladelets outnumber both blades and flakes. In the last named group, most of the flakes are either core-dressing flakes or those detached from blade-cores. However, there are nine Levallois flakes, as well as, three flake-cores in the industry. The blades and bladelets have generally triangular, trapezoidal or plano-convex cross-section. Some of them contain longitudinal prepared ridge on the dorsal surface.

1. *Ibid.*, Fig. CPM. 4—No. 5. Also in Fig. CPM. 5—No. 12.
2. These flakes were removed from the end of cores to rejuvenate the striking-platforms of blade/bladelet cores.
3. Twenty-one unretouched blades and eighty-one bladelets are broken. A few specimens in both the categories show ridge-preparation. However, the proportion of the first blades as well as unprepared or partly prepared blades is considerable in the blank-group. Blades are in general quite thick.

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TABLE 7

S.No.	Core-type	Nos.	%
	I. *Bladelet core*		
1.	Prismatic—with one platform	2	5.88
2.	Prismatic—with two platforms	1	2.94
3.	Conical—with a ridge on under-surface	1	2.94
4.	Conical—with broad end and a ridge on under-surface	2	5.88
5.	Conical—with flat under-surface	4	11.76
6.	Conical—with broad end and flat under-surface	4	11.76
7.	Flat-based with broken end	1	2.94
8.	Unfinished with prepared ridge	6	17.64
9.	Broken and undetermined	7	20.58
	Total	28	82.35
	II. *Flake-core*		
10.	Partly prepared	2	5.88
11.	Levallois	1	2.94
	Total	3	8.82
	III. *Irregular core*	3	8.82
	Grand Total	34	99.99

Blade-bladelet cores obviously form the majority in the core group. They have generally one striking platform. Eleven in the total of twenty-eight are conical, one of them being pyramidal. Besides, nine of the cores have flat under-surface. It appears that in most of the cores, a longitudinal ridge was prepared before detaching blades-bladelets, a majority of which is thin and well-made, having very regular outline and parallel sides. The length of the slender bladelets is an evidence for the technological perfection achieved by the makers of the culture.

The retouch appearing on the various implements is another evidence for the technological advancement of the Upper Palaeolithic man of Lahariadih. It was invariably very regular and neat, and was mostly used for backing the blades and bladelets. In this case, the retouch is generally unifacial, resulting in curved, straight or denticulated side. The Micro-Gravette points, however, show slightly different technique. In case of these, the lowermost two-third portion is neatly retouched from one surface only. But, the remaining-one third, which is the uppermost part, has been retouched from both the surfaces. The retouch-marks are very regular and

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neat, but at the same time, it is not the ridge-back retouch (cf. Fig. XXXVIII, 8 & 9). Looking at the retouch scars, it seems that in such cases, most probably, the pressure technique was adopted.

The denticulated backs were made, however, by the usual percussion method. It also appears that the pressure technique was not limited to a few backed specimens only. At least in one case the marginal retouch on the ventral surface was also done by this method (Fig. XXXVIII, 23).

The length-breadth measurements of the artefacts are given below in the form of a table.

TABLE 8[1]

LENGTH

Size-range (in mm.)	Simple flake	Ret. flake	Bladelet	Blade	Blade/ core	Flake core	Total	%
0-9	—	—	—	—	—	—	—	—
10-19	5	3	10	—	3	—	21	9.85
20-29	24	11	50	16	7	1	109	51.17
30-39	11	4	20	16	7	1	59	27.69
40-49	2	2	7	4	3	—	18	8.45
50-59	—	—	—	2	2	—	4	1.87
60-69	—	2	—	—	—	—	2	0.76
Total	42	22	87	38	22	2	213	99.49

BREADTH

0-12	—	—	87	—	1	—	88	41.31
13-19	14	5	—	38	10	—	67	31.45
20-29	24	10	—	—	8	1	43	20.18
30-39	3	5	—	—	3	1	12	5.63
40-49	1	2	—	—	—	—	3	1.40
Total	42	22	87	38	22	2	213	99.97

1. The table does not include the badly broken specimens.

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Though the dominant blank-type in the industry is bladelet, yet, as mentioned earlier, many of them are fairly long, some comparing well with the blades and flakes in length. A few of them are broken, and yet, they measure more than 40 mm. in length. The blades are rather short in general, and there are only two specimens which measure more than 49 mm. Most of them are only slightly broader than the bladelets, and all the blades of the industry fall within the width-range of 13-19 mm. A few very small bladelet-cores are in fact the core-rests.

It may be mentioned that the stratum from which the Upper Palaeolithic artefacts were excavated also yielded a few pieces of hematite in dark brown or chocolate colour. Incidently, some of the paintings appearing on the inner wall of the rock-shelter are exactly in the same colour, and, compared to the other paintings executed in red or orange colour, they are more primitive in style as well as contents. This may be taken as an evidence to suggest that the Upper Palaeolithic man of the region was also probably a painter.[1] Mention may also be made of a small engraved bone piece, found from the surface of the shelter (Fig. XXXIX, 21). On closer examination it appears to be a fragment of a decorated bone point. If it can be correlated with the lowermost stratum of the site, it may be said that the artistic activities of the Upper Palaeolithic man of the region were not limited to the rock-paintings only, but he also chose sometimes other media of art expression.

Siddhpur

As referred to earlier, at this site in the Karwi *tahsil* of the Banda district, the tools of both the Middle and the Upper Palaeolithic phases are found from the surface. With a view to ascertaining whether there are any separate stratigraphical horizons of the two, a small area was selected in the middle of the valley for exploratory sounding.[2] The Upper Palaeolithic tools are found upto the depth of 30 cms. in the uppermost silt deposit. They occur in a fairly large quantity in the first five centimetres, and the number gradually diminishes as one goes deeper, finally coming to an end at the depth of about 30 cms.

The raw material used in the industry is crypto-crystalline silica, the same which was used for the Middle Palaeolithic artefacts. A typological screening of the finished and the semi-finished tools is given below.

The most striking typological feature of the industry is once again a sizeable quantity of notched tools and denticulates made on flakes, blades and bladelets. Among the notched tools, there are some blades and bladelets which have notches

1. A detailed study of the rock-paintings of the region is under preparation. Since the present monograph deals primarily with the lithic industries, the discussion on the paintings is being left out.
2. The section has already been described in the Chapter II.

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TABLE 9

S. No.	Tool-type	Nos.	%
1.	Lunate	2	1.45
2.	Backed bladelet	8	6.83
3.	Backed bladelet with denticulated side	4	2.91
4.	Bladelet with one retouched side	5	3.64
5.	Bladelet with retouched side and top	1	0.72
6.	Bladelet with retouched top	1	0.72
7.	Bladelet with retouched side and base	1	0.72
8.	Bladelet with both sides retouched	3	2.18
9.	Backed blade	5	3.64
10.	Blade with one retouched side	5	3.64
11.	Tanged blade	2	1.45
	Burin		
12.	Burin on obliquely truncated core	1	0.72
13.	Transverse burin	1	0.72
14.	Axial dihedral burin	1	0.72
15.	Burin on atypical end scraper	3	2.18
16.	Multi-dihedral burin on bladelet core	1	0.72
17.	Offset dihedral burin	1	0.72
18.	Alternate beaked burin	2	1.45
19.	Burin on notch	1	0.72
20.	Axial dihedral burin with retouched side	1	0.72
21.	Pseudo-burin	2	1.45
	Total of burins	14	10.21
22.	Borer on bladelet	1	0.72
23.	Borer with two retouched sides	1	0.72
24.	Atypical Borer	1	0.72
25.	Atypical point	2	1.45
	End scraper		
26.	Nosed end scraper on flake	1	0.72
27.	End scraper on broken flake	1	0.72
28.	Ogival end scraper with notched side	2	1.45
29.	End scraper on thick bladelet	2	1.45
30.	Pseudo end scraper	1	0.72
	Total of end scrapers	7	5.10

(Contd.)

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S. No.	Tool-type	Nos.	%
31.	Backed flake	7	5.10
32.	Concave side scraper	1	0.72
33.	Flake with retouched top	2	1.45
34.	Flake with retouched base	1	0.72
	Notched tool		
35.	On bladelet near base	4	2.91
36.	On blade	5	3.64
37.	On bladelet	7	5.10
38.	On flake near base	2	1.45
39.	On flake	8	5.83
40.	On flake near top	3	2.18
41.	On chip	2	1.45
	Total of notched tools	31	22.82
	Denticulate		
42.	On flake	8	5.63
43.	On blade	4	2.91
44.	On bladelet	5	3.64
45.	Micro-denticulate on blade	1	0.72
46.	Micro-denticulate on chip	2	1.45
	Total of denticulates	20	14.59
47.	Partially retouched flake	6	4.37
48.	Partially retouched blade	4	2.91
49.	Partially retouched chip	2	1.45
	Grand Total	137	99.85

just near the base. Several similar specimens were found from the surface also. It is important to note that the number of all the types of backed blades and bladelets is comparatively smaller in this industry, although seven flakes have also been abruptly retouched on the longer sides. Lunates and backed bladelets are the microlithic types. Burins are fairly well represented, and are of various types. Typical borers are only two. There are definite examples of end scrapers, but their proportion is not high.

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The following tables indicate the various blank and core-types, which denote the blank-detaching techniques used in the industry.

TABLE 10

S. No.	Core-type	Nos.	%
	Blade-bladelet core		
1.	Prismatic with one striking-platform	7	6.45
2.	Prismatic with two striking-platforms	12	16.12
3.	Prismatic with more than two striking-platforms	2	6.45
4.	Conical	2	6.45
5.	Pyramidal	1	3.22
6.	Unfinished	1	3.22
	Total of blade-bladelet cores	25	80.64
	Flake core		
7.	Prepared non-Levallois with two striking-platforms	2	6.45
8.	Levallois	1	3.22
9.	Irregular	3	9.67
	Total of flake-cores	6	19.34
	Grand Total	31	99.98

TABLE 11

S. No.	Blank-type	Simple	Part. ret.	Finished tool	Total	%
1.	Unprepared flake	1	—	1	2	0.37
2.	Partly prepared flake	8	2	11	21	3.92
3.	Prepared non-Levallois flake	20	2	21	43	8.03
4.	Levallois flake	—	—	2	2	0.37
5.	Flake from blade core	10	2	6	18	3.36
6.	Blade	34	2	24	60	11.21
7.	Bladelet	70	2	44	116	21.68
8.	Core rejuvenating flake	5	—	2	7	1.30
9.	Chip	225	2	5	232	43.36
10.	Undetermined	25	—	9	34	6.35
	Total	398	12	125	535	99.95

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The factory nature of the industry is sufficiently attested to by the occurrence of a large number of chips, various retouched and unretouched blank-types, and a good quantity of cores. Bladelets clearly outnumber the blades and flakes, but their larger proportion is left unretouched. Among the blade-bladelet cores, the prismatic form is the most common. It needs to be emphasised that the angle between the prepared striking platform and the surface from which the blade-bladelets have been removed is comparatively low among the cores, ranging between 60° and 85°. Besides, the striking-platforms of the blades and bladelets in most of the cases are very small. Can it be suggested that indirect percussion with the help of a suitable pointed tool was the usual practice adopted by the Upper Palaeolithic man for removing blades and bladelets ? If the observations of Bordes[1] are also applied here, the answer will be affirmative.

The following table records the length and breadth-ranges of the various artefacts :

TABLE 12

Size-range (in mm.)	Flake		Bladelet	Blade	Core	Total	%
	Simple	Retouched					
LENGTH							
0- 9	—	—	—	—	—	—	—
10-19	3	5	7	—	—	15	11.45
20-29	12	24	14	2	18	70	53.43
30-39	11	10	—	5	8	34	25.95
40-49	2	7	—	—	1	10	7.63
50-59	—	1	—	—	1	2	1.52
Total	28	47	21	7	28	131	99.98
BREADTH							
0-12	3	3	21	—	—	27	19.84
13-19	15	18	—	7	10	50	38.16
20-29	6	18	—	—	16	40	30.53
30-39	4	5	—	—	2	11	8.39
40-49	—	—	—	—	—	—	—
50-59	—	3	—	—	—	3	2.29
Total	21	47	21	7	28	131	99.21

1. Bordes, F. 'Considerations sur la Typologie et les Techniques dans le Paleolithique', *Quartar*, Band 18, 1967, pp. 25-55, and Figures 4 to 6 ; Also, Bordes, F. and Crabtree, Don, 'The Corbiac Blade Technique and Other Experiments', *Tebiwa*, Vol. 12, No. 2, 1969, pp. 1-21.

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It may be mentioned that the table does not include broken specimens. As in the previous industry, most of the blades and flakes are short in this one also. The bladelets, on the other hand, are generally of the medium size. Unfortunately, majority of the specimens is broken, and consequently no clear picture about their size can be obtained.

Ainchwara

The village Ainchwara is situated on the bank of a small river named Ohan on the Karwi-Manikpur road. It is nearly eleven kilometres south-east of Karwi and about nine kms. north-east of Manikpur in the Banda district. The exact site is located on the slope of a hillock on the left bank of the river, about one kilometre south of the village. It is indeed a factory site, littered with thousands of artefacts of various sizes. They are found in the form of small clusters. Each cluster contains finished tools, core-dressing flakes, cores and numerous chips. The site is so rich that in less than an hour we could collect as many as two thousand six hundred and twenty-three artefacts, which are made of chert and other stones of the quartz group. The artefacts (Figs. XLII & XLIII) may be broadly classified as follows :

TABLE 13

S. No.	Artefact-type	Nos.	%
1.	Finished tool	534	20.35
2.	Partially retouched flake	183	6.97
3.	Partially retouched blade/bladelet	56	2.13
4.	Partially retouched nodule	20	0.76
5.	Retouched chip	72	2.74
6.	Unretouched flake	511	19.48
7.	Unretouched blade/bladelet	350	13.34
8.	Chip	228	8.69
9.	Core	591	22.53
10.	Unclassified	78	2.97
	Total	2623	99.96

It is evident from the above table that as many as five hundred and thirty-four specimens have been converted into finished tools, while a sizeable number contains marks of partial retouch. Looking at the above classification it may be safely held that it was a factory-cum-habitation site. A detailed typological classification of the finished and semi-finished tools is given below :

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TABLE 14

S.No.	Tool-type	Nos.	%
1.	Lunate	8	1.00
2.	Backed bladelet	17	2.14
3.	Truncated blade/bladelet	5	0.63
	Blade/bladelet with one retouched side		
4.	Concave	13	1.63
5.	Straight	35	4.41
6.	Concavo-convex	10	1.26
7.	Convex	9	1.13
	Total of blades/bladelets with one retouched side	67	8.44
	Blade/bladelet with both retouched sides		
8.	Both margins straight	7	0.88
9.	One straight and other concave	6	0.75
10.	One concave and other convex	4	0.50
11.	Both concave	5	0.63
	Total of blades/bladelets with both retouched sides	22	2.77
	Notched and denticulated tool		
12.	Notched blade	20	2.52
13.	Blade/bladelet with notch near base	6	0.75
14.	Blade/bladelet with notch near top	5	0.63
15.	Bladelet with abruptly retouched denticulated sides	4	0.50
16.	Denticulate on blade/bladelet	50	6.30
17.	Denticulate on flake	67	8.44
	Total of notched & denticulated tools	152	19.16
18.	Blade/bladelet with retouched top	10	1.26
19.	Backed blade	14	1.76
20.	Atypical borer	2	0.25
21.	End scraper	17	2.14
22.	Atypical end scraper	18	2.26
23.	Steep scraper on thick round flake/nodule	10	1.26

(*Contd.*)

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S. No.	Tool-type	Nos.	%
	Burin		
24.	Offset burin	29	3.65
25.	Offset double burin	2	0.25
26.	Offset dihedral burin	6	0.75
27.	Transverse burin	8	1.00
28.	Single-stroke axial burin	1	0.12
29.	Axial burin on retouch	4	0.50
30.	Axial dihedral burin	6	0.75
31.	Axial burin	5	0.63
32.	Axial double burin	1	0.12
	Total of burins	62	7.81
33.	Side scraper on nodule	7	0.88
34.	Transverse scraper	7	0.88
35.	Double side scraper	5	0.63
36.	Flake with more than two retouched sides	11	1.38
37.	Wavy-edged side scraper	2	0.25
38.	Convexo-concave side scraper	4	0.50
39.	Concavo-straight side scraper	2	0.25
40.	Conceve side scraper	2	0.25
41.	Straight side scraper	8	1.00
42.	Convex side scraper	21	2.65
43.	Flake with retouched top	11	1.38
44.	Obliquely retouched flake	2	0.25
45.	Retouched chips	72	9.07
46.	Partially retouched flake	183	23.07
47.	Partially retouched blade/bladelet	56	7.06
48.	Partially retouched nodules	20	2.52
	Grand Total	793	99.50

The various tools are made on flakes, blades, bladelets, nodules and chips. It is important to note that the largest number of tools is made on different flakes, followed by blades, chips, bladelets and nodules. Thus, the picture that emerges from this classification is not the usual one, since in most of the Upper Palaeolithic industries of the world flake and bladelet tools appear only in small proportions.

Among the various finished tool-types, a small number, including lunates (8), backed bladelets (17) and truncated bladelets (2), may be put under the head microlith. Two typical microlithic forms—triangle and trapeze—are absent. It needs to be emphasised that the denticulates, made on blades, flakes and bladelets, as well as the

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various notched tools, appear in a large proportion in this industry. This may be regarded as one of the important typological features of the industry. Though the number of burins is not very large, there are various types in the group. All the types of offset burins form the majority. The different types of side scrapers also occur in a considerable proporation. Among them, the simple convex side scraper occupies the dominant position. It is difficult to classify further the seventy-two retouched chips, and yet, the sheer number of these specimens prompts us to regard them as a significant typological feature. A good number of blades and bladelets contains marks of marginal retouch at a low angle. The resultant edges are straight, concave, concavo-convex and convex. The end scrapers, both typical and atypical, are made on flakes, blades and bladelets. Among them, those made on bladelets with small convex working edge are quite interesting. It may also be mentioned that a few end scrapers made on flakes and blades are of ogival type.

The blank-detaching techniques employed in the industry are reflected by the numerous cores and blanks.

The pictures emerging from the tables (15 & 16) do not agree with each other in one important respect. In the table of blanks, there is a sizeable number of flakes, but the other table dealing with the core-types shows only two flake-cores. This apparent anomaly clearly leads us to the conclusion that almost all the flakes have been detached during the process of core-dressing. This also explains the appearance of a sizeable number of primary and prepared flakes in the table of blanks. Thus, it may be safely held that it is essentially a blade-bladelet industry, in spite of the presence of a large number of flakes and flake-tools in it.

TABLE 15

S. No.	Blank-type	Finished Tool		Simple[1]		Total	%
		Nos.	%	Nos.	%		
1.	Primary flake	105	19.66	144	13.22	249	15.34
2.	Flake detached from blade core	5	0.93	50	4.59	55	3.38
3.	Core rejuvenating flake	1	0.18	16	1.46	17	1.04
4.	Prepared flake	140	26.21	301	27.64	441	27.17
5.	Blade	149	27.90	88	8.08	237	14.60
6.	Bladelet	62	11.61	262	14.05	324	19.96
7.	Chip	72	13.48	228	20.93	300	18.48
	Total	534	99.97	1089	99.97	1623	99.97

1. The simple blanks also include the partially retouched specimens.

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TABLE 16

S. No.	Core-type	Nos.	%
	I *Blade-bladelet core*		
1.	Thick flake utilized as bladelet-core	20	3.38
2.	Conical with one striking platform	37	6.26
3.	Conical with one st. pl. and flat undersurface	104	17.59
4.	Prismatic with one st. pl.	175	29.61
5.	Blade core with two platforms and flat undersurface	49	8.91
6.	Prismatic with two platforms	53	8.96
7.	Prismatic with more than two platforms	15	2.53
8.	Unfinished and broken cores	136	23.01
	II *Flake-core*		
9.	Prepared non-Levallois	2	0.33
	Total	591	100.58

Majority of the blade/bladelet cores contains only one striking platform, generally made by careful working. But more than one hundred specimens contain two platforms, one on each end, and as many as fifteen cores have more than two platforms. Obviously, when it was not possible to detach any more blades/bladelets from the regular platform, attempts were made to remove blades from other directions by preparing more platforms. The practice of preparing a ridge along the longer axis of the core for detaching the required blades and bladelets was known to the Upper Palaeolithic inhabitant of Ainchwara. But, it needs to be emphasised that this process was not adopted in all the cases. There are some cores in the industry, which do not show any prepared ridge. There is evidence to suggest that either an attempt was made to make use of natural ridges of the raw material, or strokes were given right away on the prepared striking platforms following the usual trial and error method. In the latter case, there was no natural or artificial ridge on the core.

The number of conical cores is very small in the industry. It is noteworthy that in several cases, blades/bladelets were removed from one of the surfaces only, and the ventral surface was intentionally made flat. But, the largest number of cores is prismatic in form, with flutings all around. It is also important to note that, as at Siddhpur, the angle between the striking-platform and the surface from which blades/bladelets have been detached is acute in the majority of the cases, suggesting thereby that the indirect percussion method was adopted for the purpose. The angle ranges mostly between 65° and 85°.

Since the industry contains a sizeable number of artefacts, their measurement has been taken under three different heads, *viz.*, blades, flakes and bladelets (Tables 17, 18 & 19). The width of the bladelets has not been included in the table because it always measures less than 12 mm. The broken specimens have not been included in the tables.

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TABLE 17

Size-distribution of Blades

LENGTH

Size-range (in mm.)	Simple	Part. ret.	Burin	End scr.	Marginal retouch	Top ret.	Trunc.	Backed	Total Nos.	Total %
20-29	15	10	—	10	44	5	4	8	96	49.74
30-39	27	8	2	3	16	2	1	3	62	32.12
40-49	6	4	2	3	12	—	—	1	28	14.50
50-59	1	—	—	—	6	—	—	—	7	3.62
Total	49	22	4	16	78	7	5	12	193	99.98
BREADTH										
13-19	44	18	—	12	65	4	5	10	158	81.86
20-29	5	4	4	4	13	3	—	2	35	18.13
Total	49	22	4	16	78	7	5	12	193	99.99

Among the blades, a large number measures between 20 and 29 mm. in length, and there are only seven specimens which are more than 49 mm. Thus, the blades of the industry are generally short as in other industries. But, the same cannot be said about the bladelets of the industry. More than 63% of them fall in the measurement-range of 20-29 mm., and a few measure even more. Looking at their narrow width, these specimens are considerably long.

Most of the bladelets are less than 9 mm. in thickness, and as many as 32.57% measure upto 4 mm. only. Surprisingly, the flakes of the industry are also generally short, and, with reference to their length, they can be favourably compared with the blades. A large majority of the specimens measures less than 39 mm., and none of them exceeds 59 mm. in length. Similarly, most of the flakes are also not very broad, since nearly 90% of them fall within the width-range of 10-29 mm. They are also generally thin.

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TABLE 18

Size-distribution of Flakes

LENGTH

Size-range (in mm.)	End. sc.	Burin	Ret. chip	Part. ret.	Scraper	Denti.	From Blade-core & core rejuv.	Pri-mary	Prep-ared	Total	%
0- 9	—	—	—	—	—	1	—	—	—	1	0.13
10-19	2	—	21	16	9	20	12	5	12	97	13.07
20-29	3	6	2	43	33	15	29	38	169	338	45.55
30-39	2	9	—	28	17	3	13	54	93	219	29.51
40-49	2	3	—	5	1	2	2	40	18	73	9.83
50-59	—	1	—	—	1	—	—	7	5	14	1.88
60-69	—	—	—	—	—	—	—	—	—	—	—
70-79	—	—	—	—	—	—	—	—	—	—	—
Total	9	19	23	92	61	41	56	144	297	742	99.97
BREADTH											
0- 9	—	—	—	1	—	—	14	—	—	15	2.02
10-19	1	1	23	26	20	9	19	20	60	179	24.12
20-29	4	10	—	56	30	21	21	49	166	357	48.11
30-39	1	6	—	9	10	7	2	40	58	133	17.92
40-49	2	2	—	—	1	3	—	32	9	48	6.06
50-59	1	—	—	—	—	1	—	3	4	9	1.21
60-69	—	—	—	—	—	—	—	—	—	—	—
Total	9	19	23	92	61	41	56	144	297	742	99.98

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TABLE 19

Size-distribution of Bladelets

LENGTH

Size-range (in mm.)	Unre-touched	Part. ret.	End. sc.	Margi-nally ret.	Ret. top	Not-ched	Trunca-ted	Backed	Abrupt denti-culate	Total	%
0- 9	—	—	1	—	—	—	—	—	—	1	0.45
10-19	35	—	2	3	2	—	3	5	—	50	22.62
20-29	105	7	—	15	—	—	—	10	3	140	63.34
30-39	19	—	—	6	—	1	—	2	1	29	13.12
40-49	1	—	—	—	—	—	—	—	—	1	0.45
Total	160	7	3	24	2	1	3	17	4	221	99.98

BREADTH - All the specimens fall within 1-12 mm. measurement range.

THICKNESS

0- 4	42	2	—	12	1	1	3	9	2	72	32.57
5- 9	110	5	3	12	1	—	—	5	2	138	62.44
10-14	8	—	—	—	—	—	—	3	—	11	4.97
15-19	—	—	—	—	—	—	—	—	—	—	—
Total	160	7	3	24	2	1	3	17	4	221	99.98

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Kalinjar

Situated at a distance of about twenty three kilometres south of Naraini and nearly sixty kilometres from the district town Banda, Kalinjar is already famous in the history of India as a seat of the Chandela power. An Upper Palaeolithic factory site was located on a small hillock, situated on the right bank of the Baghain, nearly three kilometres west of the Kalinjar fort and township. While Lower Palaeolithic artefacts were found in the loose gravel-spread of the river, the adjoining hillock is littered with Upper Palaeolithic material (Fig. XLIV). Once again, the man of this late phase of the Palaeolithic period seems to have patronised the stones of the quartz group for manufacturing his implements. A total number of 1233 artefacts were collected from the surface. It is unfortunate that no particular stratigraphical horizon can be assigned to them at this site. Four hundred and twenty-eight finished and semi-finished implements of the industry may be typologically classified as under :

TABLE 20

S. No.	Tool-type	Nos.	%
1.	Triangle	1	0.23
2.	Lunate	1	0.23
3.	Backed bladelet	6	1.40
4.	Backed blade	8	1.86
5.	Backed blade with concave side	5	1.16
6.	Backed flake	3	0.70
7.	Backed flake with retouched side	2	0.46
8.	Federmesser	1	0.23
9.	Atypical Federmesser	2	0.46
	Burin		
10.	Axial burin on a notch	2	0.46
11.	Single stroke axial burin	3	0.70
12.	Axial burin on proximal end	2	0.46
13.	Axial dihedral burin with round edge	2	0.46
14.	Axial burin	1	0.23
15.	Offset burin	2	0.46
16.	Transverse burin	1	0.23
17.	Flat-faced carinated burin	1	0.23
	Total of burins	14	3.27

(*Contd.*)

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S. No.	Tool-type	Nos.	%
	End scraper		
18.	Nosed end scraper	1	0.23
19.	Typical end scraper	11	2.57
20.	Atypical end scraper	5	1.16
	Total of end scrapers	17	3.97
21.	Blade with one retouched side	10	2.33
22.	Blade with both retouched sides	13	3.03
23.	Blade with retouched margin and base	2	0.46
24.	Blade with retouched top	4	0.93
25.	Bladelet with retouched margin	4	0.93
	Borer		
26.	Double borer	2	0.46
27.	Middle borer	9	2.10
28.	Side borer	14	3.27
29.	Atypical borer	5	1.16
	Total of borers	30	7.00
	Point		
30.	Narrow backed point	2	0.46
31.	Typical point on flake	3	0.70
32.	Atypical point	5	1.16
	Total of points	10	2.32
	Denticulate		
33.	Side-denticulate on blade	9	2.10
34.	Double side-denticulate on blade	2	0.46
35.	Side-denticulate on core	1	0.23
36.	Double side-and top-denticulate on core	1	0.23
37.	Peripheral-denticulate on core	1	0.23
38.	Peripheral-denticulate on flake	1	0.23
39.	Side-denticulate on flake	25	5.84
40.	Double side-denticulate on flake	25	5.84
41.	Double side-and base-denticulate on flake	1	0.23
42.	Double side-and top-denticulate on flake	2	0.46
43.	Side-and top-denticulate on flake	3	0.70
	Total of denticulates	71	16.58

(*Contd.*)

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S. No.	Tool-type	Nos.	%
	Notched tool		
44.	Bladelet with notch close to base	2	0.46
45.	Bladelet with notch on top	1	0.23
46.	Bladelet with notch on side	8	1.86
47.	Blade with notch on top	2	0.46
48.	Blade with notch on side	7	1.63
49.	Flake with notch on top	1	0.23
50.	Flake with notch on base	1	0.23
51.	Fiake with notch on side/sides	5	1.16
	Total on notched tools	27	6.16
	Side scraper and others		
52.	Angle scraper	2	0.46
53.	Transverse scraper	2	0.46
54.	Straight side scraper	4	0.93
55.	Convex side scraper	6	1.40
56.	Concave side scraper	7	1.63
57.	Concavo-convex side scraper	2	0.46
58.	Zig-zag side scraper	2	0.46
59.	Double convex side scraper	2	0.46
60.	Double straight and convex side scraper	2	0.46
61.	Double straight side scraper	1	0.23
62.	Flake with retouched side and base	3	0.70
63.	Flake with retouched top	90	21.02
64.	Flake with retouched top and base	1	0.23
	Total of side scrapers and others	124	28.97
	Partly retouched blanks		
65.	Partly retouched bladelet	4	0.93
66.	Partly retouched blade	6	1.63
67.	Partly retouched flake	62	14.48
	Total of partly retouched blanks	73	17.05
	Grand Total	428	99.84

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As the other Upper Palaeolithic industries of Southern Uttar Pradesh, the Kalinjar industry also contains some microliths and other retouched bladelets. But, their number is comparatively limited, and the flake and blade elements occupy a dominating position not only among the finished tools but in the industry as a whole. A distinguishing typological feature of the Kalinjar industry is a sizeable quantity of various types of borers. Nearly half of them belong to the category of side-borers. The borer point in this case is located side-wards, mostly on the distal and rarely on the proximal end. It is also slightly curved, and resembles to some extent with the *Zinken* of the Hamburgian culture, found at Meiendorf[1] and Stellmoor,[2] though the curved borer point of the Kalinjar industry is not so long as in the other one. Denticulates and notched tools, as usual, form a considerably large group. It is important to note that none of the denticulates is made on bladelet, though notched bladelets make their appearance. A majority of the denticulates is on flakes, and in three cases, core-rests have been converted into them. Among the side scrapers, simple concave and convex types predominate. Surprisingly, flakes with retouched top form a sizeable proportion. End scrapers, both typical and atypical, also make their presence felt. Though there are many types of backed specimens in the industry, their percentage is rather small. The type termed as backed blade with concave side is of particular interest. In this case the working edge has been turned concave by small marginal retouch on the dorsal or the ventral surface. There are three Federmessers in the industry, two of them being atypical. Several types of burins form another interesting feature. Attention may also be drawn to the fact that various types of axial burins, and not the offset varieties, appear in larger proportion.

More than a thousand blanks and one hundred and seventy-one cores give a fairly good idea about the blank-detaching techniques adopted in the Kalinjar industry.

TABLE 21

S. No.	Core-type	Nos.	%
	I. *Blade/Bladelet core*		
1.	Prismatic with two platforms	29	16.95
2.	Prismatic with one platform	12	7.01
3.	Prismatic with more than two platforms	9	5.26
4.	Conical	18	10.58
5.	Core with flat under-surface and two platforms	27	15.78
6.	Core with flat under-surface and one platform	43	25.14
7.	Unfinished	22	12.86
8.	Broken and irregular core	9	5.26
	II. *Flake-core with prepared sides*	2	1.16
	Total	171	99.94

1. For details, see Rust, A., *Das Altsteinzeitliche Rentierjagerlager Meiendorf*, Neumunster, 1937.
2. For details, see Rust, A., *Die Alt-und Mittelsteinzeitlichen Funde von Stellmoor*, Neumunster, 1953.

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TABLE 22

S. No. Blank-type	Simple	Partly ret.	Finished tool	Total	%
1. Unprepared flake	70	—	11	81	7.64
2. Partially prepared flake	60	10	41	111	10.48
3. Prepared non-Levallois flake	123	20	79	222	20.95
4. Flake from blade-core	85	23	85	193	18.22
5. Core rejuvenating flake	28	—	1	29	2.73
6. Blade	35	7	83	125	11.80
7. Bladelet	27	4	31	62	5.85
8. Undetermined	30	9	21	60	5.66
9. Chip	176	—	—	176	16.61
Total	634	73	352	1059	99.92

There is an apparent dichotomy between the two tables given above. According to the table of blanks, various types of flakes account for the majority; on the other hand, there are only two flake-cores in the other table, and the remaining one hundred and sixty-nine were used for detaching blades and bladelets. It may be recalled that the similar position existed in other industries like Ainchwara also. A plausible explanation of this anomaly, as mentioned earlier with reference to other industries, appears to be that almost all the flakes were taken off during the process of core-dressing. The unprepared and partly prepared ones are the first few flakes from the nodules, while the prepared varieties must have been detached during the final dressing of the cores. Thus, in spite of the large proportion of the flakes, it basically remains a blade-bladelet industry. The blade-bladelet cores fall under three broad categories, *viz.*, prismatic, those with flat under-surface and conical. They contain one, two or more thoroughly prepared striking platforms. These platforms and the surface from which blade/bladelets have been removed form an acute angle as also observed in some other industries, like Ainchwara and Siddhpur.

The retouch is either almost abrupt (above 75°) or at a considerably low angle (below 50°). It is mostly on the dorsal surface, but specimens having alternate retouch also form a sizeable proportion. In the case of denticulates, both the types of retouches were adopted. When it was done unifacially, a narrow gap was left between the two chips of the retouch, resulting in micro or macro-denticulation, depending upon the size and intervening gaps among the chips. Retouch by pressure technique was not observed on any specimen.

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TABLE 23[1]

Size range (in mm.)	Blank-type[2] S. No. 1 & 2	S. No. 3	S. No. 4 & 5	Blade	Blade-let	Core	Total	%
LENGTH								
0- 9	—	2	5	—	—	—	7	0.87
10-19	2	45	23	—	2	15	87	10.83
20-29	9	130	108	43	21	70	381	47.44
30-39	18	34	60	18	11	55	196	24.40
40-49	12	8	26	8	1	23	78	9.71
50-59	30	3	—	3	—	6	42	5.23
60-69	10	—	—	—	—	2	12	1.49
Total	81	222	222	72	35	171	803	99.97
BREADTH								
0- 9	—	—	3	—		—	3	0.38
10-19	6	81	90	70		69	316	40.30
20-29	20	108	75	18		74	295	37.62
30-39	37	25	33	—		17	112	14.31
40-49	10	8	15	—		9	42	5.35
50-59	8	—	6	—		2	16	2.04
Total	81	222	222	88		171	784	100.00

From the point of view of size, the artefacts, as tabulated above, are clearly divisible into two groups. In the first group may be placed the large flakes of the unprepared and partially prepared types. Rest of the specimens are shorter. It is interesting to note that the blades and the prepared flakes are more or less identical in length. In fact, had we not stuck to the precise length-breadth ratio of the blanks, many of these prepared flakes would have been classified as blades, since quite a few of them fall only slightly shorter in length than double their width. The bladelets are generally short.

Lodhawara

The village Lodhawara is situated at a distance of nearly five kilometres north-east of Karwi, close to a hill of the same name, in Banda district. From east

1. The table generally does not include the broken specimens. However, the breadth of sixteen blades has been measured and they have been included in the lower half of the table.
2. The serial numbers, referred to under this head, are from the table of blanks (Table 22).

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to west this hill is more than a kilometre long. The actual site is situated at the western foot of the Lodhawara hill, hardly five hundred metres away from the river Paisuni. Once again it is a factory site, very rich in all sorts of artefacts. It appears that there is a definite cultural layer at the site which is covered by a thin layer of the hilll detritus. The tools are mostly found on the eroded surface. As usual they are made of the rocks of the quartz group. A broad screening of the industry is given below in the form of a table.

TABLE 24

S. No.	Artefact-type	Nos.	%
1.	Finished tool	173	34.06
2.	Partly retouched flake	25	4.98
3.	Partly retouched blade/bladelet	2	0.40
4.	Simple flake	154	20.67
5.	Levallois point	1	0.20
6.	Simple blade	15	2.98
7.	Simple bladelet	6	1.19
8.	Chip	41	8.16
9.	Core for flake	40	7.96
10.	Core for blade/bladelet	47	9.36
	Total	504	99.98

Is is clear from the above table that flakes, and not blades and bladetets, occupy a dominant position in the industry. But, quite a few of them have been detached from the bladelet-blade cores. If only the cores are taken into consideration, the blade/bladelet element seems to have an edge over the flake-element. Out of the five-hundred and four artefacts, one hundred and seventy-three have been converted into various finished tools, which are shown in Table 25.

In general, the majority of the finished tools (Figs. XLV & XLVI) is made on flakes, and the blade/bladelet implements occupy a secondary position. But, some of the common typological features of the Upper Palaeolithic phase of Southern Uttar Pradesh do appear in this industry also, though in a limited quantity. It is this factor which has prompted us to place this industry under the head Upper Palaeolithic. The microliths are represented by backed bladelets and an atypical triangle. Besides, there is a backed blade and a Federmesser. The latter is made, however, on a bladelet (hence atypical). The borers made on flakes and blades, as also the atypical borers made on flake, blade and bladelet, are generally found in the industries around Karwi. Various types of burins, both offset and axial, further add to the Upper Palaeolithic character of the industry. Then there are numerous denticulates

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TABLE 25

S. No.	Tool-type	Nos.	%
1.	Backed bladelet	2	1.15
2.	Triangle/atypical	1	0.57
3.	Backed blade	1	0.57
4.	Federmesser on bladelet	1	0.57
5.	Blade with marginal retouch	3	1.73
6.	Borer on blade	1	0.57
7.	Borer on flake	3	1.73
8.	Atypical borer with denticulated sides	7	4.04
9.	Point	1	0.57
10.	Awl	1	0.57
11.	Simple convex-scraper	4	2.31
12.	Simple concave-scraper	5	2.89
13.	Simple concavo-convex scraper	5	2.89
14.	Simple straight-scraper	4	2.31
15.	Transverse scraper	2	1.15
16.	Double side scraper	10	5.78
17.	Convergent scraper	2	1.15
18.	Flake with more than two retouched sides	2	1.15
19.	Notched flake	28	16.18
20.	Notched blade/bladelet	2	1.15
21.	Denticulated flake	54	31.21
22.	Denticulated blade	7	4.04
23.	End scraper	7	4.04
24.	End scraper—atypical	2	1.15
25.	Round scraper	2	1.15
26.	Steep scraper	5	2.89
27.	Knife	4	2.31
28.	Truncated blade	1	0.57
29.	Transverse Burin	1	0.57
30.	Offset dihedral burin with round edge	1	0.57
31.	Offset burin	2	1.15
32.	Offset burin on proximal end	1	0.57
33.	Double axial burin	1	0.57
	Total	173	99.26

and notched tools of all types, though they are mostly made on flakes. End scrapers fare comparatively better. Mention may also be made of an unfinished bone implement (Fig. XLVI, 3), found from the flat top of the Lodhawara

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hill. It is thoroughly worked on the edges by pressure-technique. It is difficult to determine whether it belongs to the Upper Palaeolithic industry of the site.

Among the various other Upper Palaeolithic industries of Southern Uttar Pradesh, which have been left out from the above discussion, mention may be made of at least two of them. The first one is that of Ahirpurwa, a small village in a valley, about six kilometres north-west of Manikpur in Banda district. The industry is characterised by the dominance of bladelets and tools made on them, though flake- and blade-tools are also not wanting (Fig. XL). A few burins as well as some denticulated and notched implements also occur. The second industry comes from the vicinity of the village Mahugarh, about 2 km. south-east of Drummondganj in Mirzapur district. It contains some very good examples of Federmessers, though, unfortunately, most of them are broken (Fig. XLVI). One of them (Fig. XLVI, 4) closely resembles the "*Neuwieder Federmesser*" of Bosinski and Hahn.[1]

Resume

The Upper Palaeolithic industries are wide spread in the Mirzapur and Banda districts of Southern Uttar Pradesh. The description even of a selected number of them, as above, provides a fairly good idea of the techno-typological characteristics of this phase (Graphs 5 & 6). It is true that all the discussed industries do not contain exactly the same features. But, at the same time, it must be emphasised that they all share many common characteristics which bind them together, and justify treatment as belonging to one cultural phase. The individual features of the different industries may be taken as regional variations. We have noted the following common characteristics among these industries in different proportions :

1. Bladelets form a large proportion of all the blanks. Sometimes they outnumber both blades and flakes.

2. A small number of microliths appears in all the industries. Backed bladelets and lunates are the most frequent types among the microliths. The trapeze is altogether absent, and the triangle is found only rarely.

3. Flake tools, particularly various types of side scrapers, form another common typological feature. However, almost all these flakes were detached from the nodules during the process of core preparation, as it is evident from the fact that the flake-cores are either absent, or appear in a small proportion in all the industries.

4. Denticulates and notched tools occur in a sizeable quantity. They are made on flakes, blades, bladelets, and rarely on core rests.

1. Bosinski, G. and Hahn, J.-Der Magdalenien-Fundplatz 'Andernach (Martinsberg)', *Rheinische Ausgrabungen*, Band II, Tafel. 53, 7.

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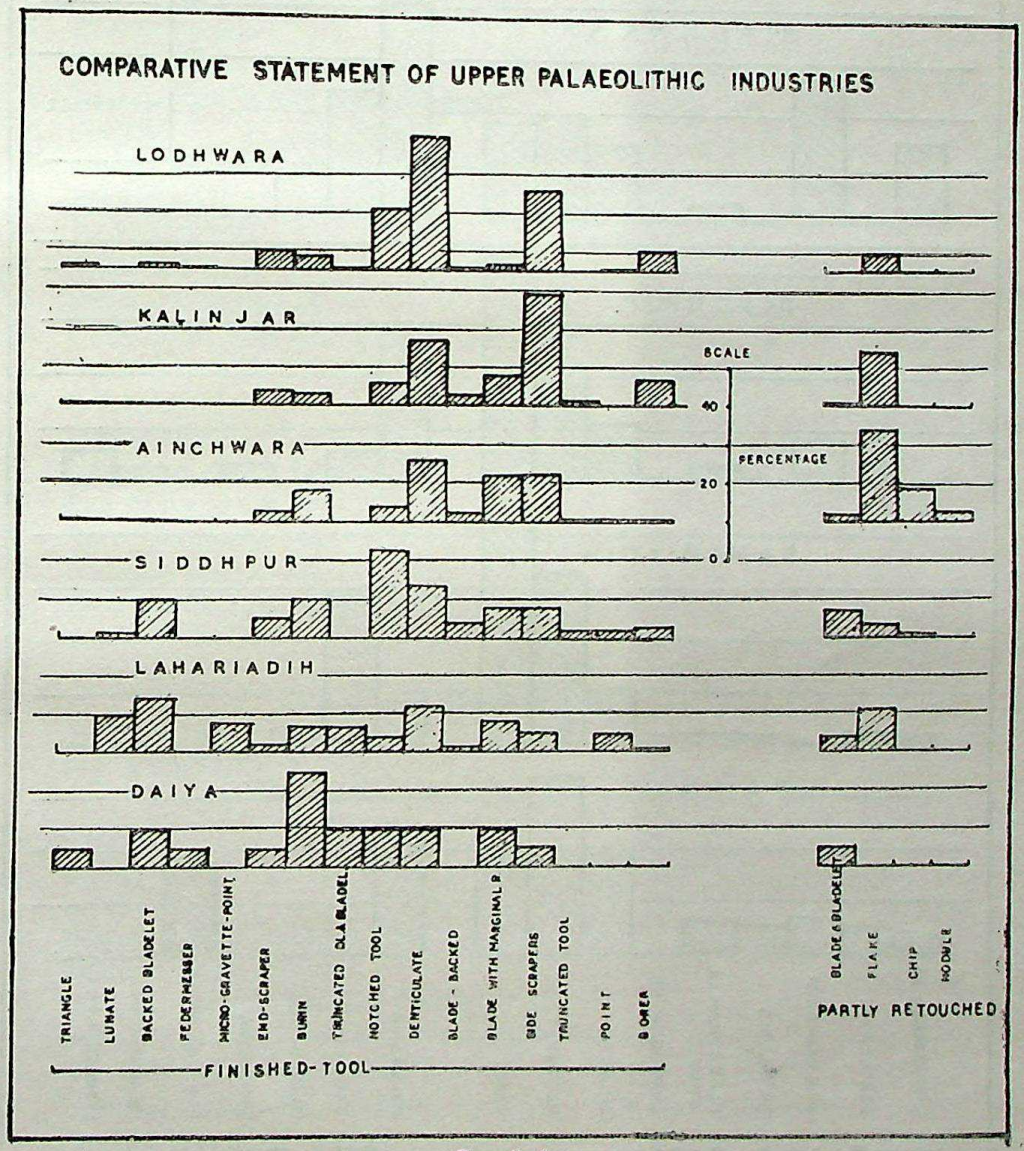
5. Among the finished tools, backed specimens (flake, blade and bladelet) constitute a typical feature of these industries, though they do not appear in a very large number. Federmesser and Micro-gravette point, occurring in a few of them, are the specialised types of this category.

6. There are some negative features as well. Various types of burins (many of them being offset), end scrapers, borers, points, and truncated blades and bladelets do appear in most of these industries, but, unlike their European counterparts, their number is generally very limited. Similarly, long and broad blades are rather poorly represented.



Graph 5

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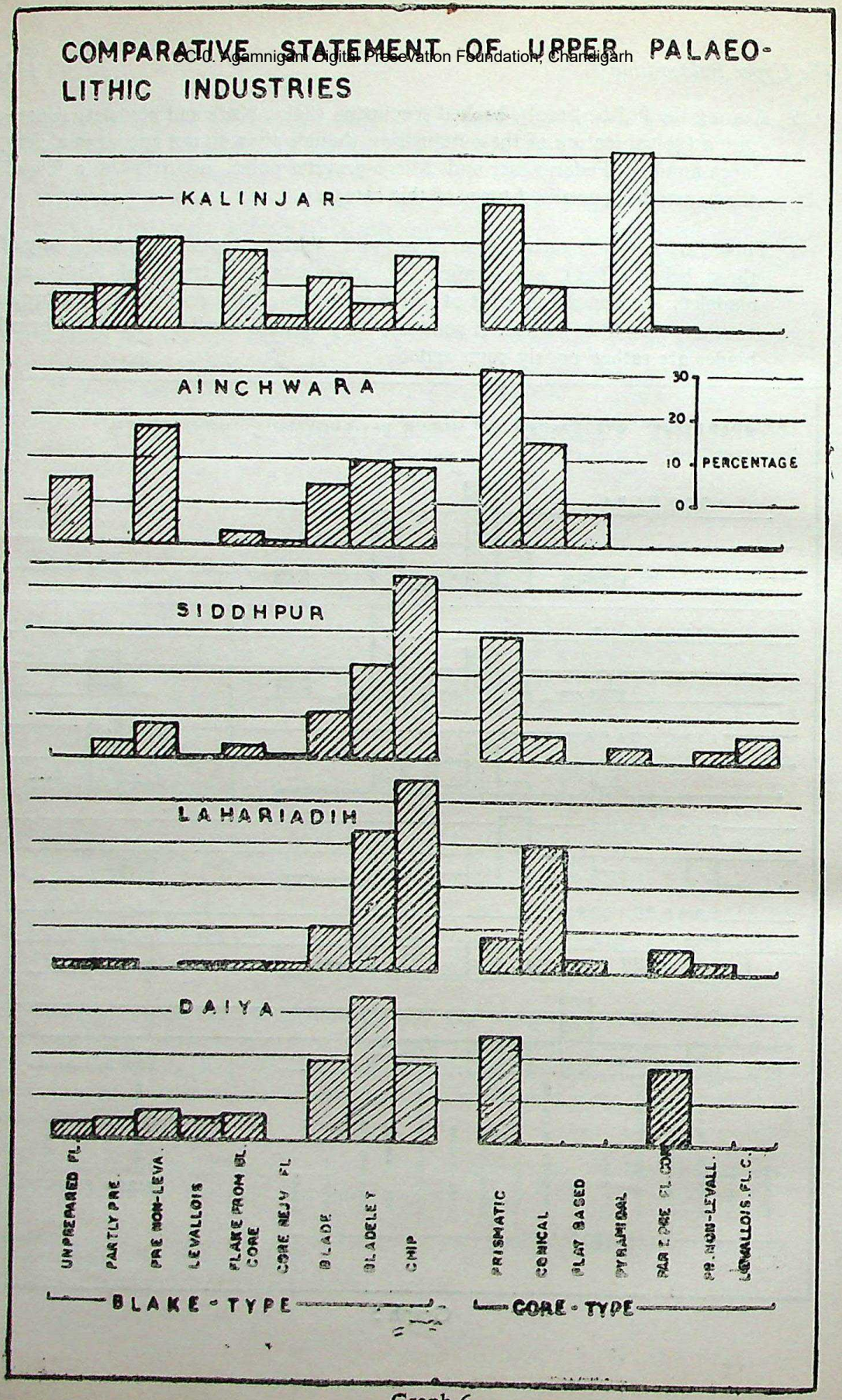

Graph 6

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LIST OF ILLUSTRATED SPECIMENS

DAIYA

Fig. XXXVII

1. Atypical triangle
2. Backed bladelet
3. Broken bladelet
4. Broken bladelet
5. Broken bladelet
6. Broken bladelet with partial retouch
7. Bladelet
8. Obliquely truncated bladelet with marginal retouch
9. Bladelet with marginal retouch
10. Broken bladelet
11. Truncated blade
12. Single stroke axial burin
13. Offset burin on proximal end
14. Partially retouched blade
15. Federmesser
16. Broken blade
17. Partially prepared flake
18. End scraper on flake
19. Core-rejuvenating flake
20. Prismatic bladelet core
21. Prismatic blade/bladelet core

LAHARIADIH

Fig. XXXVIII

1. Lunate
2. Lunate
3. Lunate
4. Backed bladelet (broken)
5. Backed bladelet (broken)
6. Obliquely truncated backed bladelet
7. Obliquely truncated bladelet with marginal retouch
8. Micro-Gravette point with broken tip
9. Micro-Gravette point (broken)
10. Atypical Micro-Gravette point

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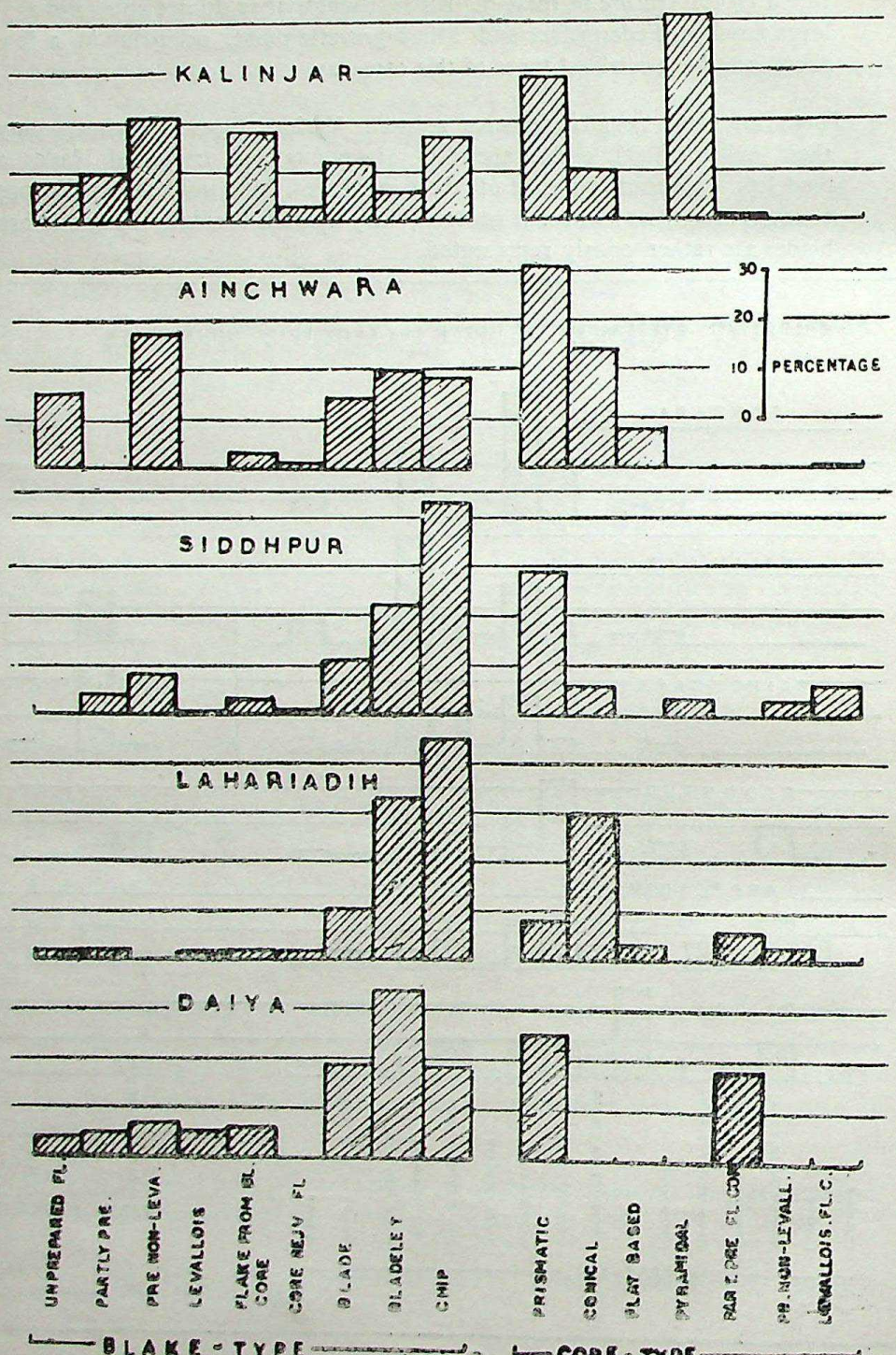
COMPARATIVE STATEMENT OF UPPER PALAEOLITHIC INDUSTRIES



Graph 6

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LIST OF ILLUSTRATED SPECIMENS

DAIYA

Fig. XXXVII

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9. Bladelet with marginal retouch
10. Broken bladelet
11. Truncated blade
12. Single stroke axial burin
13. Offset burin on proximal end
14. Partially retouched blade
15. Federmesser
16. Broken blade
17. Partially prepared flake
18. End scraper on flake
19. Core-rejuvenating flake
20. Prismatic bladelet core
21. Prismatic blade/bladelet core

LAHARIADIH

Fig. XXXVIII

1. Lunate
2. Lunate
3. Lunate
4. Backed bladelet (broken)
5. Backed bladelet (broken)
6. Obliquely truncated backed bladelet
7. Obliquely truncated bladelet with marginal retouch
8. Micro-Gravette point with broken tip
9. Micro-Gravette point (broken)
10. Atypical Micro-Gravette point

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11. Bladelet with both retouched sides
12. Bladelet with one retouched side (retouch on ventral)
13. Bladelet with one retouched side (retouch on ventral)
14. Bladelet with one retouched side (retouch on dorsal)
15. Point on bladelet (obliquely worked)
16. Borer on flake with retouched side
17. End scraper on bladelet (broken)
18. Double borer on blade with retouched sides (surface find)
19. End scraper on bladelet
20. Micro-denticulate on blade (broken)
21. Micro-denticulate on blade (broken)
22. Bladelet with denticulated back
23. Denticulated backed blade with marginal retouch (on ventral)
24. Notched flake
25. Denticulate on flake
26. Notched flake
27. Blade
28. Single stroke axial burin on retouch with obliquely truncated base
29. Axial burin on flake
30. Offset burin on proximal end
31. Axial burin on flake (?)

Fig. XXXIX

1. Bladelet
2. Bladelet (broken)
3. Bladelet (broken)
4. Bladelet with marginal retouch on ventral
5. Bladelet (broken)
6. Primary bladelet
7. Bladelet (broken)
8. Conical bladelet core with flat under-surface
9. Prismatic bladelet core with two platforms
10. Conical bladelet core with flat under-surface
11. Levallois flake core
12. Prismatic bladelet core
13. Prismatic bladelet core
14. Concave side scraper (broken)
15. Partially retouched flake
16. Core-rejuvenating flake
17. Flake from blade/bladelet core (broken)
18. Borer on flake
19. Core-rejuvenating flake

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20. Core-rejuvenating flake
21. Engraved bone point (?)

AHIRPURWA

Fig. XL

1. Bladelet with abrupt retouch on both sides (broken)
2. Backed bladelet with marginal retouch
3. Backed bladelet
4. Backed bladelet with marginal retouch (broken)
5. Backed bladelet with a notch
6. Denticulated backed bladelet with denticulated side (broken)
7. Bladelet with marginal retouch (broken)
8. Denticulated bladelet
9. Backed bladelet with marginal retouch
10. Backed bladelet with marginal retouch
11. Blade with abrupt retouch on one side (broken)
12. Bladelet (broken)
13. Double side scraper on a flake from blade-core
14. End scraper on an unprepared flake with retouched side
15. Partially retouched bladelet
16. Axial dihedral burin with retouched side
17. Backed blade with denticulated margin (broken)
18. Double side scraper
19. Blade with marginal retouch
20. Blade
21. Partially retouched flake
22. Prismatic blade/bladelet core

SIDDHPUR—2

Fig. XLI

1. Backed bladelet with denticulated side (broken)
2. Backed bladelet with denticulated side (broken)
3. Bladelet with one retouched margin (broken)
4. Bladelet with both retouched margins (broken)
5. Notched bladelet (broken)
6. Denticulate on bladelet (broken)
7. Notched bladelet (broken)

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8. Bladelet with retouched top and side
9. Denticulate on blade (broken)
10. Denticulate on bladelet (broken)
11. Backed flake
12. Micro-denticulate on blade (broken)
13. Borer with two retouched sides (with broken tip)
14. Atypical point
15. Blade (broken)
16. Blade (broken)
17. Offset dihedral burin
18. Flake core
19. Prismatic bladelet core

AINCHWARA

Fig. XLII

1. End scraper on bladelet
2. End scraper on bladelet with retouched margins
3. End scraper with notched edge
4. End scraper
5. End scraper
6. End scraper on a broad flake
7. Atypical end scraper
8. Atypical end scraper with notched edges
9. End scraper on core rejuvenating flake
10. End scraper on partially retouched blade
11. Atypical end scraper
12. Blade with notched margin
13. Denticulate on bladelet
14. Blade with both margins retouched--straight
15. Blade with concavo-convex margins
16. Bladelet with concave margin
17. Bladelet with straighto-concave margins
18. Bladelet with concave margin
19. Bladelet with straight margin
20. Bladelet with convex margin
21. Denticulate on bladelet
22. Denticulate on bladelet
23. Bladelet with straight margins
24. Denticulate on bladelet
25. Bladelet with straight margin

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26. Denticulate on bladelet
27. Bladelet with concave and straight margins
28. Denticulate on bladelet
29. Bladelet with concave margin
30. Blade with retouched top
31. Truncated bladelet with notched margin
32. Truncated bladelet
33. Blade with retouched top
34. Bladelet with a notch near base
35. Trnncated blade with concave margin
36. Truncated blade with retouch on both margins
37. Offset burin on retouched distal end
38. Double offset burin with round edge
39. Offset burin with round edge
40. Axial burin with round edge
41. Transverse burin on flake
42. Transverse burin on blade
43. Offset dihedral burin
44. Axial dihedral burin
45. Backed bladelet (convex-back)
46. Backed bladelet (straight-back)
47. Backed bladelet (convex-back)
48. Backed bladelet (straight-back)
49. Backed bladelet (straight-back)
50. Backed blade (denticulated)
51. Bladelet with abruptly retouched denticulated sides
52. Bladelet with abruptly retouched denticulated sides
53. Primary bladelet
54. Bladelet
55. Bladelet
56. Side scraper with abrupt retouch on other side (partial)
57. Steep scraper on thick flake
58. Steep scraper on thick flake
59. Steep scraper on split nodule
60. Steep scraper made on bladelet core-rest

Fig. XLIII

1. Lunate
2. Lunate
3. Backed bladelet
4. Lunate (broken)
5. Retouched chip

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6. Double side scraper with convex and concave sides
7. Double side scraper with straight and convex sides
8. Partially retouched flake
9. Straight side scraper
10. Convexo-concave side scraper
11. Partially retouched flake
12. Partially retouched nodule
13. Flake with notched top
14. Flake with notched top
15. Side scraper with wavy side
16. Convex side scraper
17. Flake retouched on more than two sides
18. Transverse scraper
19. Denticulate on blade
20. Denticulate on Levallois flake
21. Denticulate on Levallois flake
22. Denticulate on core-rest
23. Denticulate on Levallois flake
24. Obliquely retouched flake
25. Atypical borer
26. Borer with retouch on same surface
27. Core-rejuvenating flake
28. Core-rejuvenating flake
29. Triangular flake from blade core
30. Flake from blade-core
31. Thick flake converted into bladelet core
32. Thick flake converted into bladelet core
33. Blade-core with one striking platform : flat-based
34. Prismatic blade-core
35. Conical blade-core with flat base
36. Blade-core with one striking platform : Prismatic
37. Blade-core with more than two striking platforms
38. Blade-core with two platforms : Prismatic
39. Flake-core
40. Blade-core with one striking platform : Prismatic

KALINJAR

FIG. XLIV

1. End scraper on backed bladelet
2. Backed bladelet (broken)

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3. Backed point on bladelet
4. Backed point on bladelet
5. Backed blade with concave margin
6. Backed bladelet
7. Side and top denticulate on flake
8. Triangle (?)
9. Broad flake with retouched top (high angle retouch)
10. Double side and top denticulate on flake
11. Denticulate on blade (broken)
12. Blade
13. Partially retouched blade (broken)
14. Blade with retouched margins and base
15. Blade with notch on side
16. Denticulate on bladelet
17. Offset burin
18. Axial burin on a notch
19. Side denticulate on flake
20. Atypical borer
21. Middle borer
22. Double borer (side)
23. Side denticulate on flake
24. Notched blade

LODHAWARA

FIG. XLV

1. Atypical triangle (on a broad flake)
2. Backed bladelet (broken)
3. Backed bladelet (broken)
4. Borer
5. Borer (with broken tip)
6. Backed blade
7. Federmesser (broken)
8. Side scraper
9. Levallois point
10. Notched flake
11. Denticulated bladelet
12. Denticulated bladelet
13. Denticulated flake
14. Double denticulate on blade (broken)
15. Notched blade

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16. Offset dihedral burin
17. Single stroke offset burin on proximal end
18. Double axial burin—round edged
19. Truncated flake
20. Retouched Levallois core-rest
21. Discoidal core

FIG. XLVI

1. End scraper on long flake
2. Steep scraper
3. Bone tool (unfinished)

MAHUGARH

4. Federmesser (*Neuwieder ?*)
5. Federmesser (broken)
6. Federmesser (broken)
7. Federmesser (broken)
8. Backed blade (broken)
9. Bladelet with marginal retouch
10. Single stroke axial burin
11. Axial burin
12. Lunate

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CHAPTER VI

General Discussion and Conclusion

The foregoing discussion, spread over four chapters (from II to V), clearly indicates that all the three phases of the Palaeolithic period are adequately represented in Southern Uttar Pradesh. Moreover, the industries of the various phases exhibit some new features and tool traditions, which certainly add to the importance of the region. It is true that most of these industries come from the surface, but by comparative analyses they can be easily correlated with the stratified finds of the Belan, the Seoti and other adjoining regions. These stratified deposits generally provide only a relative chronology, except of course the absolute radio-carbon dates of the gravel III of the Belan. But the problem of chronology is not peculiar to our region. Most of the palaeolithic industries of the Indo-Pakistan sub-continent cannot be fixed in an absolute chronological frame. No Lower Palaeolithic industry can be given even a probable date with any amount of certainty. The first aggradational deposits, yielding artefacts of this phase, have been variously assigned to the Middle[1] and Late Pleistocene[2] periods by different scholars. During the last few years, the second gravels of some river-sections of Maharashtra have been given C^{14} dates ranging from about 40,000 to 17,000 B.P.[3] Middle Palaeolithic industries have been found associated with these gravels. But, can all the Middle Palaeolithic industries of the sub-continent be placed within this time-bracket ? Perhaps it will not be very reasonable to do so, particularly with reference to the industries of Southern Uttar Pradesh. As it is well known, the gravel III of the Belan has been dated to about 20,000 B.P.,[4] which incidently happens to be the only radio-

1. De Terra, H. and Paterson, T.T., *Studies on the Ice Age*, etc., pp. 314-317; Also, Joshi, R.V., 'The Characteristics of the Pleistocene Climatic Events in Indian Sub-continent—A Land of Monsoon Climate', *Indian Antiquary*, 1970, p. 58 ff.
2. Wainwright, G.J., *The Pleistocene Deposits of the Lower Narmada River*, Baroda, 1964; Also Rajguru, S.N., 'Some New Fossil-Discoveries from Western Maharashtra', *Puratattva*, No. 2, pp. 16-20.
3. Agrawal, D.P. and Kusumgar, S., *Prehistoric Chronology and Radiocarban Dating in India*, pp. 41-43.
4. Agrawal, D.P. and Kusumgar, S., 'Tata Institute Radiocarbon Date List XI', *Radiocarbon*, Vol. 17, No. 2, 1975, p. 20, TF-1245. Also, Sharma, *et al.*, *Beginnings of Agriculture*, p. 3.

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carbon date for any Upper Palaeolithic industry in U.P. On this evidence at least, the later part of the time-bracket given to the Middle Palaeolithic industries of Maharashtra coincides with the date of the Upper Palaeolithc complex of our region. If the Middle Palaeolithic complex of Uttar Pradesh is also to be placed somewhere within the aforesaid time-bracket, it has to be its earlier part. Similarly, no firm conclusions can be drawn regarding the environmental conditions prevailing in the region during the various phases of the Pleistocene. This is particularly true when one takes into consideration the limitation of the evidence for palaeo-environment and the inadequacy of the palaeo-climatalogical studies conducted so far.

Lower Palaeolithic Industries

After the pioneering discoveries of the Yale-Cambridge expedition, it was accepted on all hands that two Lower Palaeolithic cultures existed in the Indo-Pakistan sub-continent. The Soan culture, characterised by pebble-tools, continued to be recognized as a feature of the north-westren part till 1963, when Khatri[1] claimed the existence of a true pebble-tool industry at Mahadeo-Piparia on the Narmada. This claim was, however, later disproved by Supekar's investigations.[2] But, by this time, pebble-tools had been reported from many areas of the Peninsula, although they were always associated with Acheulian industries. At some places, the pebble-tool element was as much as 40%.[3] This complicated the issue further, and doubts were expressed about the very existence of the Soan Culture.[4] The discovery of a true pebble-tool industry at Lahchura at this time was significant, since it not only supported the separate existence of the Soan Culture in the north-west, but also indicated the possibility of a pebble-tool culture in Central India. During subsequent years, a few more pebble-tool industries were found at different sites in Peninsular India. They are Nittur in Karnataka,[5] Bhimbetka in Raisen district of Madhya Pradesh[6], and Konkan in Maharashtra.[7] The stratigraphical position of the industry is undetermined at the first site. In Konkan, the pebble-tools were obtained from *in situ* gravels at several localities, but their exact chronological position could not be determined, since no other deposit yielded any cultural

1. Khatri. A.P., 'Mahadevian : An Oldowan Pebble Culture in India', *Asian Perspectives*, Vol. VI, Part 1-2, pp. 186-97; also by the same author, 'Stone Age and Pleistocene Chronology of the Narmada Valley, Central India', *Anthropos*, Vol. 56, 1961, pp. 519-530.
2. As referred to by Sankalia, H.D., *Prehistory and Protohistory*, etc., p. 115.
3. Issac, N., *Stone Age Cultures of Kurnool*, Unpublished thesis, University of Poona, 1960.
4. One of the main problems, discussed at the Seminar on Indian Prehistory held at Poona, in May, 1964, was 'Is Soon a separate Culture ?' ; for details, see *Indian Prehistory-1964*, (eds. Misra and Mate), 1965, pp. 1-14.
5. Ansari, Z.D., 'Pebble Tools from Nittur (Mysore State)', *Indian Antiquary*, Third Series, Vol. IV, Nos. 1-4, 1970, pp. 1-17.
6. Wakankar, V.S., 'Bhimbetka—The Prehistoric Paradise', *Prachya Pratibha*, p. 14.
7. Joshi, R.V. and Bopardikar, B.P., 'Stone Age Cultures of Konkan', *Archaeological Congrees and Seminar Papers*, (ed. Deo, S.B.), pp. 47-51.

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material. In fact it is only at Bhimbetka that one gets a clear idea of the stratigraphical and chronological position of the pebble-tool industry. Here it belongs to the earliest cultural levels, lying below the Acheulian strata. Some open air factory sites of the pebble-tools have also been reported from the adjoining regions of Bhimbetka.[1] These discoveries are fairly sufficient to establish the existence of a pebble-tool culture of the Lower Palaeolithic phase in the Peninsular India. The question is, in what relationship does it stand with the Acheulian industries of the sub-continent ? If the culture sequence of Bhimbetka, as noticed by Wakankar,[2] is regarded as representative for the whole of the Peninsular India, the pebble-tools mark the beginning of human activity and the Acheulian culture belongs to the succeeding phase. Somewhat similar sequence has been claimed by Paterson and Drummond in the Potwar region. The Middle Stellenbosch, representing the earliest phase of the handaxe complex in the region, is chronologically later than the Lower Soan and is sandwiched between the Middle Soan A and the Middle Soan B.[3] According to Paolo Groziosi, the Acheulian industry found at Morgah in the Potwar region is assignable to the second phase of the Upper Pleistocene.[4] Sankalia, however, points out to a possibility that the handaxe culture in Punjab may be as old as the Early Soan.[5] Will it be justified, however, to conclude on the basis of the above evidence that the pebble-tool industries always preceded the Acheulian culture all over the Indo-Pakistan sub-continent ? Probably the data are still insufficient to arrive at such a general conclusion. It is quite possible that some of the pebble-tool industries of the Peninsular India are contemporary with the Acheulian industries. The evidence from Africa as well as Europe does suggest such a possibility.

The chopper-chopping-tool industries of the Lower Palaeolithic phase have been claimed from different parts of Europe. Among them, a few deserves particular mention. The industry revealed by the excavations at Vallonnet cave on the Mediterranean coast, in South France, is slightly younger in age than the Oldowan industry of the Bed I at Olduvai Gorge in Africa, though both of them were found associated with the Upper Villafranchian fauna.[6] Thus, the Vallonnet assemblage and a few others in the same region represent the earliest human activity in Europe, though several other chopper-chopping-tool industries also exist in South France, which belong to Lower and Middle Pleistocene periods.[7] The re-examinatoin of the assemblages

1. Wakankar, *op. cit.*
2. *Ibid.*
3. Paterson, T.T. and Drummond. H.J.H., *Soan the Palaeolithic of Pakistan*, p. 13, Fig. 2 (chart).
4. Referred to by Sankalia, H.D., 'A Revised Study of the Soan Culture', *The Anthropologist*, Vol. XIV, No. 1, 1967, p. 35.
5. Sankalia, H.D., 'The Handaxe Industry in the Punjab', *Perspectives in Palaeoanthropology*, pp. 213-219.
6. de Lumley, H., 'Le Premiers Industries Humaines en Provence', *La Prehistoire Francaise*, Vol. I, No. 2, Paris, 1976, pp. 765-776.
7. *Ibid.*, and, de Lumley, H., *et al.*, 'Le Primiers Industries Humaines en Languedoe Mediterraneen et en Roussillon, *La Prehistoire Francaise*, Vol. I, No. 2, 1976, pp. 777 ff.

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associated with Claton-on-sea in Great Britain by Hazzledine Warren[1] revealed that they were also chopper-chopping-tool industries. But, Ohel regards the Clactonian sites as 'preparatory areas' of Acheulians.[1a] They were roughly contemporary with the earlier stages of the handaxe-culture complex. Vertesszollos in Hungary is another important pebble-tool industry of Europe. On the basis of the fauna associated with it, the industry is assigned to the later half of the Mindel glacial period,[2] thus belonging to the same age in which occurred some of the earliest Acheulian industries. These examples indicate that all the pebble-tool industries of Europe did not belong to one geological period. If the Vallonnet industry and a few more existed earlier than the Acheulian culture, several others from the Mediterranean region, and the Vertesszollos and also perhaps Clacton-on-sea industries were more or less contemporary with it.

The African continent presents almost an identical picture. In the Vaal river valley in South Africa[3], and in the Bed I of Olduvai Gorge in East Afrika,[4] there is clear evidence for the existence of chopper-chopping-tool industries prior to the Stellenbosch or Acheulian culture. But, some recent investigations in East Africa reveal that a few similar industries existed side by side the handaxe-cleaver culture complex. The following observation of Mary Leakey is significant in this regard : "Nine sites have been excavated in the Middle and Upper Bed II, ... The Acheulian however, does not occur in all living sites at this level. At other sites, which are broadly contemporaneous, the culture is a developed form of the Oldowan. It would seem therefore that there were two distinct but co-existent cultural elements, during middle and upper Bed II, which at times made some degree of contact with one another".[5]

In Asia, the pebble-tool industries have been reported from many parts. The Choukoutien of China,[6] the Anyathian of Burma,[7] the Tampanian of Malaysia[8] and a few industries of Thailand[9] are some important examples. With reference to Padjitan region in Indonesia there is a controversy whether handaxes co-existed with the pebble-tools.[10] In the first two examples cited above, it appears that the cultures in their evolved forms continued during the subsequent periods as well. Except the Choukoutien culture of China and the Padjitanian of Indonesia, which may not be

1. Bordes, F., *The Old Stone Age*, pp. 92-95.
   1a. Ohel, *Current Anthropologhy*, Vol. 20, No. 4, pp. 685-726.
2. The work of L. Vertes and M. Kretzoi has been referred to by Mueller-Karpe, H., *Handbuch der Vorgeschichte*, Band I, Altsteinzeit, Muenchen, 1966, p. 320
3. Alimen, H., *The Prehistory of Africa*, London, 1957, p. 271.
4. Leakey, L.S.B. *Olduvai Gorge*, Cambridge, 1951.
5. Leakey, Mary D., 'Preliminary Survey of the Cultural Material from Beds I and II, Olduvai Gorge, Tanzania', *Background to Evolution in Africa*, (ed. Bishop, W.W. and Clark, J.D.), Chicago, 1967, pp. 432-43.
6. Mueller-Karpe, H. *op. cit.*, p. 343.
7. Bordes, F., *The Old Stone Age*, pp. 87-89.
8. Sieverking, Ann de G., 'The Palaeolithic Industry of Kota Tampan, Perak, North-Western Malaya', *Asian Perspectives*, Vol. 2, No. 2, 1958 (1960), pp. 91-102.
9. Bordes, F., *op. cit.*, p. 89.
10. *Ibid.*, 81-82.

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regarded as a true pebble-tool culture, no firm geological time can yet be assigned to any of these industries. The earliest phase of the Choukoutien belongs to the second glacial period, the time assigned to some of the earliest Acheulian industries of Europe.

The foregoing discussion about the pebble-tool industries of different regions points out to the possibility that in India also some such industries might have coexisted with the Acheulian culture, though the Bhimbetka evidence places them prior to the latter. There is no evidence in India, including the Southern Uttar Pradesh, to suggest that the handaxe-culture evolved from the preceding pebble-tool complex. Khatri[1] unsuccessfully tried to show such an evolution with reference to the industries he claimed to have found at Mahadeo Piparia. In fact, the whole idea of this unilinear evolution of cultures was implanted in the minds of prehistorians by L.S.B. Leakey through his interpretation of the evidence found in the various beds of Olduvai Gorge.[2] However, after re-examining the whole evidence, Mary Leakey reached a different conclusion, as is evident from her statement : "The occurrence of Oldowan tools in middle and upper Bed II has always been recognised, but there now appears to be no progressive evolution from the Oldowan through the 'Chellean' to the Acheulian".[3]

In most of the chopper-chopping-tool industries of the world, chopper is the most characteristic tool-type, and the chopping-tools occupy only a secondary position. The industries of the Indian sub-continent also present a similar picture, and the assemblages from Southern Uttar Pradesh form no exception to it. At all the sites of our region the choppers far outnumber all other types. As in other places the convex choppers dominate over all the other sub-types of this tool. The Early Soan industries of the Potwar region,[4] those of Himachal Pradesh,[5] Konkan in Maharashtra[6], and Nittur in Karnataka[7] exhibit similar general typological features. If one considers the other techno-typological details, one is likely to find two broad groups within the industries of chopper-chopping tool tradition, including those of our region. The industries of the Soan region form the first group, in which a large number of choppers is made on split pebbles. This typical feature of the Potwar region is not generally noticed among the industries of the Peninsular India, although some of them contain a negligible proportion of split pebbles. With reference to the industries of Kangra district, B.B.Lal noticed that most of the choppers were made

1. *op. cit.*
2. *op. cit.*, and *Adam's Ancestors*, p. 66ff.
3. *op. cit.*, p. 431.
4. De Terra and Paterson, *op. cit.*
5. Mohapatra, G.C., 'Lithic Industries of Himachal Pradesh' *Perspectives in Palaeoanthropology*, (ed. Ghosh, A.K.), pp. 199-212.
6. Joshi and Bopardikar, *op. cit.*
7. Ansari, Z. D., *op. cit.*

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on flat-based pebbles.[1] The same cannot be said about our industries. Further, the use of Levallois technique was not noticed either in the Early Soan industries or those of the Kangra district. However, the industries of Uttar Pradesh are characterised by the limited use of this technique. Flake tools are common in all.

The Acheulian industries of Southern Uttar Pradesh are characterised by flake cleavers, handaxes, side-scrapers and by the occasional occurrence of a few chopper-chopping-tools, and some denticulates and notched tools. The artefacts are generally masssive in size. The cores and flakes indicate the use of Levallois and prepared non-Levallois techniques, though examples of unprepared and partly prepared specimens are also not wanting. Thus, they share the main techno-typological characteristics of the other Acheulian industries of the Peninsular India.

The Acheulian industries are very widespread in the sub-continent. Except Kerala in the south and some regions of the north, like Himachal Pradesh and Haryana, they have been reported from almost all the parts. Nevertheless, serious attempts with a view to providing an order to these industries have hardly been made so far. Joshi[2] and Jayaswal[3] seem to be the only scholars who have tried to study this culture-complex in a wider perspective. The latter recognised three groups within the Acheulian industries of India on typological grounds, *viz.*, (1) Pebble-tool-hand-axe-cleaver group; (2) Handaxe-cleaver group, and (3) Cleaver group. In the first group pebble-tools seem to outnumber both handaxes and cleavers, and it is represented by the two industries of Mahodeo-Piparia and Vadamanu. The gronp-2 is the usual Acheulian with a large number of handaxes and comparatively a few or no cleavers. Besides those of the Potwar region, many industries of the Peninsula, like Vedullachervu, Nagarjunakonda-II, Anagwadi, Adamgarh, Vadamadurai-2, Gudiyam-2 and Lalitpur, come under this group. The third group is represented by the industries of Chirki-Nevasa and Nagarjunakanda-I only, and is characterised by the predominance of flake-cleavers upon handaxes. From the point of view of other tool-types, as well as blank-detaching techniques, the variation among the industries of the various groups is not marked. Side-scrapers are common in all the industries, and the specimens showing unprepared, partly prepared, prepared non-Levallois, and Levallois techniques are also noticed among all, though in varying proportions. Jayaswal has noted the occurrence of pebble-scrapers, made on split or flat-based thin pebbles, among most the Acheulian industries of the Peninsular India, except those of the cleaver group.

1. Lal, B.B., 'Palaeoliths from the Beas and the Banganga Valleys, Punjab' *Ancient India*, No. 12, p. 65.
2. Joshi, R.V., 'Acheulian Succession in Central India', *Asian Perspectives*, Vol. VIII, No. 1, 1964, pp. 150-63.
3. Jayaswal, V., *A Study of Prepared core technique in Palaeolithic Cultures of India*, Chapter III.

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The main difference between the groups II and III of Jayaswal lies in the varying proportions of the cleavers. But, the number of handaxes against that of cleavers is certainly not negligible in the two aforesaid industries of the cleaver group. At Chirki-Nevasa there are 194 handaxes against 244 cleavers, and at Nagarjunakonda-I they are 56 against 111. Outside India, the Acheulian with flake cleavers is best represented in the African continent, where several habitation sites of this culture have been excavated during the last few decades. It is interesting to note that the different occupation floors of the several Acheulian sites of Africa present divergent pictures with reference to the relative proportion of handaxes and cleavers. For example, at Isimila,[1] in the occupation area K19, the handaxes are 6.8% against 50.0% cleavers, but in K6 the handaxes are as much as 63.3% against 11.6% cleavers, and in U.J. 6-7 both account for 35.1% each. Similarly, at Kalambo Falls, in the occupation floor No. 6B, handaxes and cleavers are 20.6% and 8.4% respectively, but in the floor 7 they account for 7.8% and 31.4% respectively.[2] On the other hand, at Olorgesailie the handaxes have always an edge over the cleavers in all the land surfaces.[3] It is interesting to note that the dominance or subordination of cleavers is not related to the relative chronological position of the various Acheulian industries in Africa. The picture which emerges is far from being clear. It can only be said that the Acheulian man sometimes made more cleavers than handaxes and *vice-versa*. Thus, the grouping of Acheulian industries on the basis of the relative proportion of cleavers may have only typological value, and it does not seem to have any stratigraphical and chronological significance either in India or in Africa. Both the typological groups, characterised by the dominance or subordination of cleavers, are represented in our region. The Acheulian industries of the Singrauli basin, Lalitpur and Nihi contain more handaxes than cleavers, while the preference is reversed in Mahugarh, Mahuli and Gopipur industries.

According to our own observations, the Acheulian of the Indian sub-continent is divisible into two groups. The first group is characterised by handaxes, cleavers, some side scrapers, flakes and cores, all being generally massive in size. The fine marginal retouch is usually rare. Handaxes and cleavers constitute the important typological features of the second group also, but the other associated tools present a different picture. They are very much similar to those which characterise the Middle Palaeolithic industries of the Peninsula. While many of the Acheulian industries of the sub-continent belong to the first group, the second group is represented by at least

1. For details, see Howell, F.C., 'Isimila : A Palaeolithic Site in Africa', *Old World Archaeology : Foundations of Civilization*, pp. 49-58; also Kleindienst, M.R., 'Variability within the Late Acheulian Assemblage in East Africa', *South African Archaeological Bulletin*, No. 16, 1961, pp. 35-52.
2. Referred to by Binford, L.R., *An Archaeological Perspective*, p. 270.
3. For details, refer to Kleindienst, M.R., 'Components of the East African Acheulian Assemblage : An Analytic Approach', *Acts of the 4th Pan African Congress of Prehistory*, pp. 81-111.

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three industries, *viz.* Attirampakkam,[1] Paisra (Bihar)[2] and Bhimbetka.[3] The Levallois technique was extensively used in the industries of this group, The Paisra assemblage contains a very sizeable proportion of notched and denticulated tools. In the Bhimbetka industry also there are a few denticulates, but their proportion is rather low. With the probable exception of Lalitpur, all the industries of Southern Uttar Pradesh are assignable to the first group. It should be emphasised, however, that no chronological ordering is possible between these two groups of Acheulian industries. With reference to South Africa also, it is now realised that the various Acheulian industries can hardly be fixed in a definite chronological frame work. Sampson says: "..... the terms 'Early', 'Middle' and 'Late' Acheulian that appear so frequently in the literature cannot by justified by field evidence ..... This chronological scheme for the whole industry cannot be demonstrated at even one site and is based entirely on rather ill-defined differences in typology".[4]

The Lower Palaeolithic industries of the Indian sub-continent exhibit some similarities with those of southern and eastern Africa. There are both pebble-tool and Acheulian industries in the two regions. The former have an earlier beginning in Africa, and, if the Bhimbetka stratigraphy is taken as a guide, a comparable sequence can be postulated for the Peninsular India as well, although it must be made clear that, by pointing out to this similarity between the industries of the two regions, we do not intend to push the dates of our pebble-tool industries to the high antiquity of the Oldowan Culture. Francois Bordes has regarded flake-cleaver as a diagnostic feature of the Acheulian of African continent. However, he has also drawn our attention to the fact that this tool-type is abundantly found in the whole of the continent, except the north-eastern parts, like Egypt and Sudan.[5] It is also important to note that J. Guichard, who systematically examined the Acheulian industries of Nubia, did not find any evidence for the Victoria-West technique, used in South Africa for detaching cleaver-flakes.[6] In Europe, the flake-cleaver is mostly confined to the southern parts of Spain,[7] while it is extremely rare or absent in the West Asian Acheulian industries. The flake-cleaver with all its characteristic features re-appears in the Peninsular India. In fact, there is hardly any marked distinction between the Late Acheulian industries of South Africa[8] and those of the Peninsular India, where even the use of

1. We had an occasion to examine the assemblage made by Late Shri V.D. Krishnaswami at the Safdarjung Museum of the Archaeological Survey of India, New Delhi, in April, 1969.
2. Pant, P.C., Jayaswal, V., and Tiwari, R., 'Paisra: An Acheulian Site in Bihar', *Man and Environment*, Vol. II, 1978, pp., 21-31.
3. Misra, V.N., 'The Acheulian Industry of Rock-shelter, III F-23 at Bhimbetka, Central India', *Indo-Pacific Prehistory Association Bulletin*, Vol. I, 1978, pp. 130-171.
4. Sampson, C.G., *The Stone Age Archaeology of Southern Africa*, New York, 1974, p. 121.
5. Bordes, F., *The Old Stone Age*, p. 68ff.
6. Referred to by Bordes, *Ibid.*, p. 68.
7. Bordes, F., 'Acheulian Cultures in Southwest France', *Studies in Prehistory* (ed. Sen, D. and Ghosh, A.K.), pp. 52-53.
8. By South Africa we mean the countries lying south of Sahara.

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Vaal and Victoria-West techniques is attested to by several examples. Moreover, some African type rostrocarinates have also been noticed in the Acheulian industries of the Indian Peninsula.[1] Should these striking techno-typological similarities be regarded purely accidental ? If not, they certainly point out to some sort of cultural contact between South Africa and the Peninsular India. Sankalia[2] also postulated the possibility of diffusion from East Africa and considered various probable routes, taking into account the hypotheses of Blandford, Medlicott, Cornwalt, and Clark and Piggott. This contact, if true, has to be direct between the two regions, since, as we have noted earlier, the flake-cleavers and similar other African features are extremely rare or absent in north-east Africa as well as western Asia. Under the circumstances a contact between the two regions through west Asia is simply ruled out. On the other hand, in the present state of our knowledge, it does not seem possible to prove that it took place by the sea route. The two regions are widely separated from each other by the Arabian Sea and the Indian Ocean, and the intervening sea was never so shallow during the Pleistocene as to provide such a long ford.[3] Under the circumstances, no possible route of contact can be postulated and the problem remains as mysterious as ever.

Middle Palaeolithic

As mentioned earlier the Middle Palaeolithic phase of Southern Uttar Pradesh is represented by one pebble-tool industry, forming a group by itself, and a set of industries which are quite distinct from the former. While the Lahchura industry-2, belonging to the first group, is the first find of its type so far away from the nuclear region of the similar industries, which is the north-western part of the Indo-Pakistan sub-continent, the industries of the second set also contain some features which are not common among the other Middle Palaeolithic industries of Peninsular India. This makes the region important for research in the Indian Middle Palaeolithic phase, and further work may bring forth some new evidence, which may also help find out the relationship between the two sets of industries. At the present, they seem to represent two diverse traditions prevalent during the Middle Palaeolithic phase.

Lahchura-2, which is the only industry of the first group, is characterised by pebble-tools, generally smaller but typologically similar to those of the Lower Palaeolithic, and by a variety of flake-tools, like side scrapers, notched flakes, denticulates, knives and burins. Almost all the flakes are struck from the pebbles. The

1. For details of the techno-typological and other similarities between the Indian and South African Lower Palaeolithic industries, see Krishnaswami, V.D., "Stone Age India", *Ancient India*, No. 3, pp. 40-41.
2. Sankalia, H.D., *Prehistory and Protohistory*, etc., p. 139ff and Fig. 33.
3. The author discussed this problem with Dr. M.S. Srinivasan, Reader in the Department of Geology at the Banaras Hindu University, and a recognised specialist in marine geology.

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pebble element is so dominant in it that one is immediately reminded of the industries of the Potwar region. The Late Soan of de Terra and Paterson is generally regarded as a culture of the Middle Palaeolithic period.[1] It is divided into two on stratigraphical as well as techno-typological grounds,[2] and both the phases are assignable to the third glacial period. Paterson and Drummond subsequently classified the Soan culture into four, and their Upper Soan, divided into A and B,[3] seems to belong to the Middle Palaeolithic phase.

The Late Soan A and B differ mainly on account of their technological features. The Levallois flakes and cores show a marked increase in the latter. Similary, the blades also seem to occupy a dominant position in the Late Soan B.[4] The finished tools of the two groups have not been properly identified, except of course the pebble-tools, which appear in a good proportion in the Late Soan industries also. Most of the Early Soan pebble-tools survived. Taking into consideration the techno-typological features of the two phases, the Lahchura-2 industry can be compared to some extent with the Late Soan A. Like this phase of the Potwar, the industry of our region also contains some pebble-tools, a big proportion of flake-tools, and a sizeable number of cores. Levallois technique was adopted to a great extent in Lahchura-2 as well.

The Upper Soan A of Paterson and Drummond shows some affinity with Lahchura-2. Among the 120 artefacts from Ghila Khan, the richest industry of the phase, " . . . . . about 1/3 are flakes, 1/3 cores and a third (1/3) Soan type tools".[5] The industry also contains some tortoise cores, but majority of the flakes have unprepared, cortexed, high angled platforms. Some of the flakes are " . . . . . reminiscent of the European Levallois, but of course, without the faceting of the latter".[6] The flake tools include side and end scrapers, small points and notched tools.[7] All the above features except small points are found in the Lachhura-2 industry also, though the proportion of pebble-tools, cores and flakes is not exactly the same. From the point of view of technique also, there is a marked similarity, since the Levallois element is well represented in both, and the unprepared and partly prepared flakes form the majority. But the Lahchura-2 industry contains a few new types, namely denticulates, knives, a good number of convergent scrapers, including a shouldered one, and a few burins and blades. It may be mentioned that, except a 'blade-flake', the blade element is absent in the Ghila Khan industry.[8]

1. Sankalia, H.D., in *Indian Prehistory-1964*, (eds. Misra and Mate), p. 37.
2. De Terra & Paterson, *op. cit.*, p. 308 ff.
3. Paterson and Drummond, *op. cit.*, p. 70 ff.
4. De Terra and Paterson, *op. cit.*, p. 310.
5. Paterson and Drummond, *op. cit.*, p. 71.
6. *Ibid*, p. 74.
7. *Ibid.*
8. *Ibid.*

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Mohapatra has reported from Himachal Pradesh "two types of small flake-implements which on typo-technological grounds can be placed after the Early Soan industry".[1] The industry coming from the Sirsa valley contains some pebble-choppers, besides the prepared flakes, thick blades, small side scrapers, incipient borers, and bifacially flaked fine discoids. According to Mohapatra, the pebble-choppers are similar to and neater than those found in the Beas-Banganga valleys. From the point of view of technique also they are advanced. He finds some points of similarities between the Late Soan industries of the Potwar region and the industry of the Sirsa valley. The Lahchura-2 industry seems to be in general agreement with that of the Sirsa valley, but differs in details. The former contains only a few small choppers, while the others are exactly similar to those found in the Lahchura-1. If the term 'prepared flakes' means the Levallois flakes, in that case our industry shows resemblance with that of the Sirsa valley. But there are no borers and discoids in Lahchura-2, and the side scrapers are also not small in size.

Thus, the industry found at Lahchura exhibits many points of resemblance with the Late Soan A of de Terra and Paterson, the Upper Soan A of Paterson and Drummond, and the Sirsa industry discovered by Mohapatra. While the Late Soan A is rather inadequately described and consequently a point by point comparison is not possible, our industry does not exactly compare with the remaining two. The distinctions, however, are not vital. Such disagreements may always occur among various industries of the same tradition.

Outside India, the subsequent development of the pebble-tool industries has been reported from China and Burma. The locality 15 of Choukoutien is generally attributed to the Riss glaciation.[2] The industry includes choppers and chopping-tools, some of them being elongated. There are also flake-tools, some of which are large. Side scrapers including transverse scrapers appear in the industry. There are also some small leaf-shaped implements. There is definite evidence for the use of the Levallois technique, but in a very limited measure. On comparison with the Lahchura-2, one may find the points of distinction more marked than those of similarities. Similarly, the industries of the Fenho-complex in Shansi and Honan provinces of China, which are generally regarded later than the typical Choukoutien, hardly agree with our industry.[3] The Anyathian of Burma found in the Irrawaddi valley terraces is divided into early and late phases. The second phase is said to be of the third inter-pluvial and fourth pluvial periods. It contains choppers but not chopping-tools. There are also some flake tools. The evidence for the Levallois technique is also

1. Mohapatra, G.C. Comments on 'Middle Stone Age Culture in India and Pakistan', *Indian Prehistory, 1964*, (eds. Misra & Mate), Poona, 1965, p. 50. Also, by the same author, 'Lithic Industries of Himachal Pradesh', *Perspective in Palaeoanthropology : D. Sen Festschrift* (ed. A.K Ghosh), p. 208 ff.
2. Bordes, F., *The Old Stone Age*, p. 86; Also, Mueller-Karpe, H., *op. cit.*, p. 343.
3. Bordes, *Ibid.*, p. 86.

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suspected.[1] Some of the features of this industry are similar to those noticed in the Lahchura-2.

As mentioned earlier in this chapter and in the Chapter IV of the present monograph, the industries of the other group of the Middle Palaeolithic are widely distributed in Southern Uttar Pradesh. Implements of this group have been recovered from the loose gravels of the Son, the Rihand, the Ken and some other small streams. Some river-sections like those of the Belan, the Seoti and the Son have also yielded artefacts, but in all the cases their number is very small. Besides these, there are numerous factory sites, which have yielded fairly rich industries. The area around the rivers Belan and Seoti is particularly important in this respect. Among the typical typological features of these industries may be enumerated various denticulates, notched tools and side-scrapers. The last named typological group contains the largest number of convex side scrapers. Levallois is the dominant flake-detaching technique among all the industries except that of Siddhpur. The retouch is generally small and limited to margins. It is mostly on the dorsal, but specimens which are retouched on the same side, partly from the dorsal and partly from the ventral surface, also appear in a sizeable number. It may be recalled that the industries do not contain typical Mousterian point, or what is sometimes termed as *Handspitze*, typical borer and discoidal core. It may be emphasised that most of the finished tools, including side scrapers and a few knives, are not classical and can be described generally as mediocre in quality. No side scraper contains the typical Quina-retouch.

Against this, the Middle Palaeolithic industries of the Peninsular India seem to belong to a different techno-typological tradition. The industries of this group are widely distributed, covering almost the entire region lying south of the Vindhyas and the Aravallis. The raw material is mostly crypto-crystalline silica, though in some industries of Andhra Pradesh[2] and Madhya Pradesh[3], quartzite has been used instead. The type-tools almost everywhere are said to be :

"(1) Scrapers of several types such as : (a) Single hollow-sided scrapers, (b) Double hollow-sided scraper, (c) Straight side scraper, (d) Scraper-cumpoint or borer, (e) End scraper, and (f) Side and End scraper.

(2) Points (including arrowhead).

(3) Borers.

(4) Points, borers and even scrapers with incipient tang.

1. *Ibid.*, pp. 87-89.
2. The industries brought to light by Dr. S.N. Rao from the Nalgonda district and by Dr. N. Isaac from the Kurnool district. For details, see Sankalia, H.D., *Prehistory and Protohistory, etc.*, p. 174 ff.
3. According to Dr. V. Jayaswal, majority of the artefacts, excavated by Dr. S.G. Supekar from Mahadeo Piparia, is of quartzite. See, Jayaswal, V., *A Study of Prepared Core Technique in Palaeolithic Cultures of India*, Chapter IV.

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(5) Handaxe (occasionally and very few in number).
(6) Heavy duty tools like choppers (but very rarely)."[1]

The most prevalent blank-detaching technique appears to be non-Levallois and, in the words of Sankalia, "so far 'tortoise cores' have not been reported (from the handaxe area), so that we cannot say definitely that the full Levallois technique was known or employed in the manufacture of flakes."[2] However, many investigators have reported the occurrence of a few flakes, "with centrally directed flake scars on their upper surfaces, suggesting that they were detached from prepared cores."[3]

Taking into consideration the above features of the Middle Palaeolithic industries of Peninsular India, it may be difficult to find points of agreement between them and those of our region. Side scrapers are common in both, but precise types differ. While the convex side scraper is the most frequent type in our industries, the 'hollow-sided' and the 'straight-sided scrapers' seem to be the important types in the Peninsular industries. 'Side-cum-point' or 'borer' is another noteworthy tool type of the latter. Besides, points including arrow-heads and borers also fare well in these industries. These tool types are generally absent in the industries of Southern Uttar Pradesh. It may be recalled, however, that Bridget Allchin noticed the almost complete absence of points in the Middle Stone Age industries of India.[4] But, Sankalia has disputed Allchin's observation.[5] The industries of our region are characterised by a fairly high proportion of the denticulates and notched implements. They have not been reported from the Peninsular industries. However, scrapers made on flat nodules appear in both. From the point of view of technique also, both the regions stand apart. The dominant flake-detaching technique is Levallois in our industries, whereas its presence is said to be uncertain in the industries of the Peninsular India. On the contrary, Jayaswal has noticed the presence of Levallois element in many of the Peninsular Indian Middle Palaeolithic industries, particularly among those where the raw material is quartzite.[6]

Recently, we made a large collection of tools from the flat top of a small hill named Kalipahar near Jamalpur railway station, district Monghyr, Bihar. This industry, made of fine to medium grained quartzite, compares well with those of our region on many counts. Both include a good proportion of denticulates and notched tools and the Levallois is the main flake-detaching technique in both of them. But,

1. Sankalia, H.D., *Prehistory and Protohistory, etc.*, p. 149.
2. *Ibid.*, p. 148.
3. Pappu, R.S., *Pleistocene Studies in the Upper Krishna Basin*, p. 89.
4. Allchin B., *The Stone-tipped Arrow*, London, 1966, p. 78.
5. Sankalia, *Prehistory and Protohistory of India and Pakistan*, p. 148.
6. Jayaswal, V., *A Study of Prepared Core Technique in Palaeolithic Cultures of India*, Chapters IV & VI.

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the Jamalpur industry distinguishes itself in having a good percentage of end scrapers, various types of knives, and a few axes.[1]

The Middle Palaeolithic industries are numerous and varied in Europe, but they are generally designated as Mousterian. Bordes has recognised four facies within the Mousterian of Western Europe,[2] *viz.*, Typical Mousterian, Charentian (of La Quina and La Ferrassie varieties), Denticulate-Mousterian, and Mousterian of the Acheulian tradition. The last named is sub-divided into A & B.

The typical Musterian contains a good proportion of side scrapers and well developed Mousterian points (*Handspitzen*). Handaxes, *limaces*, backed knives, denticultates and notched tools account for a relatively smaller percentage. There is evidence for the use of Levallois technique to varying extent. Our industries certainly do not show affinities with the Mousterian of this tradition. The Charentian or the Quina-Ferrassie Mousterian is sub-divided into two on the grounds of overwhelming presence or near absence of the Levallois technique. This culture includes a very high percentage of side scrapers, containing scalriform retouch, some of them being transverse. A few end scrapers, often carinated, very few handaxes, a fairly good proportion of notched tools, often with Clactonian notches, some denticulates and absence of knives are the other important features. Our industries may be compared with those of the La Ferrassie sub-type, since both contain evidence for the extensive use of Levallois technique and a good proportion of side scrapers. But they differ very much with reference to the other techno-typological features. The side scrapers of the two belong to diverse traditions. This tool-type in the La Ferrassie industries is very neatly made by scalriform retouch and has a very regular form. The type appearing in our industries lacks these features. Similarly, not only is there a larger percentage of denticulates and notched tools in our industries, but the notches are also rarely of the Clactonian type. In fact, they are generally made by regular retouch. The most important feature of our industries is the lack of uniformity in retouch, while the La Ferrassie implements are characterised by the regularity of retouch. The industries of the Mousterian of Acheulian tradition contain a good number of handaxes and some Upper Palaeolithic tools, besides other several types. These features are absent in the industries of Southern Uttar Pradesh.

The Denticulate-Mousterian is characterised by: "low to very low percentage of side scrapers, often 'degenerate' none being Quina-type. High to very high percentage of denticulates and notches. Absence of true handaxes and absence or

1. Pant, P.C. and Jayaswal, V., 'Jamalpur : A Typological Variant within the Middle Palaeolithic Culture-complex of India', *Puratattva*, No. 9, 1980.
2. Bordes, F., *The Old Stone Age*, p. 98 ff. For details of the various facies of the Mousterian of Western Europe, see Bourgon, M., *Les Industries Mousteriennes et Pre-Mousteriennes du Perigord*, Memoir No. 27 of the Archives de L' Institut de Paleontologie Humaine, Paris, 1957.

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extreme rarity of backed knives. Variable percentage of Levallois flaking".[1] These features, to a very great extent, occur in our industries also. The main difference lies in the fact that the side scrapers form a bigger percentage in the industries of our region. Besides, the Denticulate-Mousterian of France generally includes high to very high proportion of denticulates and notched tools, while their percentage is usually moderate in the industries of Southern Uttar Pradesh. However, their proportion is not always very high even in the Denticulate-Mousterian of France. The industry coming from layer 38 at Combe-Grenal is said to be Denticulate-Mousterian.[2] The techno-typological features are described as : "It is a Levallois industry, well faceted, where the scraper index is low (7.6) and the percentage of denticulates high (33.6). No Mousterian points ; indeed, we will find none in any of the Denticulate-Mousterian layers ; no Quina scraper . . . . . ; no true handaxe . . . . . ".[3] The above description can be applied to our industries also with slight modifications, the only difference lying in the proportion of side scrapers. Mousterian points do not occur in either of them.

Middle Palaeolithic industries have been reported from the different parts of North Africa.[4] Chronologically they are found above the Acheulian levels. Many of them contain some handaxes and sometimes also cleavers, though small in size. Their most important characteristic appears to be the wide use of Levallois technique, and this is perhaps the reason why some of them are at times termed Levallois-Mousterian.[5] Most of them compare well with the typical Mousterian of France, though at times Quina features are also noticed. Since our industries lack the features of the typical Mousterian and are mainly characterised by denticulates and notched tools, there are hardly many points of agreement between them and the industries of North Africa, except of course the use of Levallois technique.

In South Africa, the region lying south of the Sahara, there are two main Middle Palaeolithic cultures, *viz.*, the Fauresmith and the Sangoan.[6] They are found associated with two different ecological regions. Both of them have a good proportion of Acheulian handaxes, while the former also contains some cleavers. Large picks and planes characterise the Sangaon. Both are associated with some flake tools. Levallois is the common flake-detaching technique in both. These two South African cultures show hardly any affinity with the industries of our region. While the Lower Palaeolithic phase of South Africa and that of India share so many common features that we postulated a possibility of culture-contact between the two, it is difficult to find many points of similarities between the two regions during the succeeding Middle Palaeolithic phase.

1. Bordes, F. & Sonneville-Bordes, D. de, 'The Significance of Variability in Palaeolithic Assemblages', *World Archaeology*, Vol. 2, No. 1, p. 63.
2. Bordes, F., *The Tale of two Caves*, London, 1972, p. 124 ff.
3. *Ibid.*
4. Mcburney, C.B.M., *The Stone Age of Northern Africa*, Pelican Book, 1960, p. 129 ff.
5. *Ibid.*
6. Bordes, F., *The Old Stone Age*, pp. 122-125.

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In the West Asia also the Middle Palaeolithic industries either exhibit features of typical Mousterian or that of Quina-Mousterian. The important sites are Yabrud (*Jabrud*) in Syria,[1] Ksar' Akil in Labanon,[2] Et-Tabun in Mount Carmel district of Israel,[3] Shanidar in Iraq[4] and Abu-sif cave in Jordan.[5] Naturally it is hard to find similarities between these and those of our region. The Sanghao cave in West Pakistan has yielded a Middle Palaeolithic industry made on quartz. The preliminary excavation report by Dani does not provide comprehensive data,[6] which can be fruitfully used for a comparative study. The industry contains definite evidence for the Levallois technique. Among the tool types, mention may be made of one handaxe, several types of side scrapers, points and a few burins. There is no mention of denticulates or notched tools. The industry appears to be similar to those found in the Peninsular India.

The Upper Palaeolithic

The various Upper Palaeolithic industries of Southern Uttar Pradesh show diverse characteristics, but they also share many common techno-typological features which bind them together. These techno-typological traits are to be noticed in the industry derived from the Gravel III of the Seoti also. They all contain a considerable proportion of bladelets, some of them converted into microlithic forms. Denticulates and notches are common in all. The flake-tools include mainly side scrapers, and almost all the flakes were either detached during the core preparation or rejuvenation of cores or removed from blade/bladelet cores. Long blades, burins and end scrapers form only a small proportion of the assemblages. Backed implements made on blades, bladelets and flakes are easily the typical tools, though their percentage is generally not large. Federmesser and Micro-Gravette points are some of the important types in this category.

In view of the above characteristics, the Upper Palaeolithic industries of Southern Uttar Pradesh can hardly be compared with the industries of the other parts of sub-continent. Murty's Renigunta industries obtained from the surface as well as from a trial excavation at Nallagundlu contain a very high percentage of backed blades (67.3%), followed by burins (16.24%), scrapers, awls, choppers and points.[7] Our industries neither include so many backed blades nor burins. One of

1. Rust, A., *Die Hoehlenfunde von Jabrud* (Syrien), Neumuenster, 1950.
2. Bordes, *op. cit.*, p. 126.
3. Mueller-Karpe, H., *op. cit.*, p. 340.
4. *Ibid.*, p. 342.
5. *Ibid.*, 339, and Bordes, F., *The Old Stone Age*, p. 126 ff. For details of the Middle Palaeolithic cultures of the Levant, see Howell, F.C., 'Upper Pleistocene Stratigraphy and Early Man in the Levant', *Proceedings of the American Philosophical Society*, Vol. 193, 1959, pp. 1-65.
6. Dani, A.H., 'Sanghao Cave Excavation', *Ancient Pakistan*, No. 1, 1964, pp. 1-50.
7. Murty, M.L.K., 'Blade and Burin Industries near Renigunta', *Proceedings of the Prehistoric Society*, 1968-69, pp. 83-101. Also Murty, 'Blade and Burin and Late Stone Age Industries around Renigunta, Chittoor District', *Indian Antiquary*, 1970, pp. 106-108.

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the famous Kurnool caves in Andhra Pradesh near Betamcherla was recently excavated by Murty.[1] The industry includes as many as 90.30% bone tools and only 9.70% lithic implements. Evidently, it hardly shows any similarity with the industries of our region, except that both contain some microliths, specially lunates. In Shorapur doab in Karnataka, Paddayya located a large workshop at Meralbhavi and collected 963 specimens,[2] and a trial excavation was also carried out by him subsequently. Earlier a smal'er workshop at Salvadgi in Bijapur district had already been found by Sundara.[3] The stratigraphical evidence, however, was provided by the deposits found along the Hunsgi *nala* and its tributaries.[4] The artefacts of this series were obtained from a thin deposit of 'loose pebbly granular gravel', found within the black brown silt. The industry comprises a good number of flake tools similar to those found in the Middle Palaeolithic phase and a large quantity of blades and blade tools. Paddayya has classified the blade tools under three categories—edged tools, non-edged tools and multiple tools. There are blades with retouched margins, backed and notched blades, points, borers and a variety of burins. According to Sankalia, "this Shorapur industry still leans heavily on its earlier antecedents."[5] Besides other factors, the basic difference between the Shorapur industry and those of our region lies in the near absence of bladelets and microliths in the former. Ghosh's 'flake-blade industry' found in the 'Upper clay' from four areas, *viz.*, Chandil, Sini, Ghatsila and Gua, of the Singhbhum district in Bihar comprises a higher proportion of flake tools, although the percentage of blades is also said to be high.[6] Burins and borers account for a very small proportion. This industry hardly shows any agreement with the industries of Southern Uttar Pradesh, since the flake-tool index is generally very low in the latter. Bhimbetka, the classical site for a sequence of Palaeolithic and Mesolithic industries in Madhya Pradesh, is said to have yielded an industry which appears to be Upper Palaeolithic. It contains end scrapers made on flakes and thick blades, various tools made on blades and bladelets and some burins.[7] Since detailed typological account of the industry is yet to be published, no fruitful comparison with our industries is possible.

The explorations and excavations conducted by Sali in areas A and B at Patne in Jalgaon district of Maharashtra have brought to light a full sequence of cultures from the Middle Palaeolithic to the Mesolithic periods.[8] The four subphases of the period II represent various stages of evolution of the Upper Palaeolithic

1. Referred to in Sankalia, H.D., *Prehistory and Protohistory of India and Pakistan*, p. 215 ff.
2. Paddayya, K., 'The Blade-tool Industry of Shorapur Doab, Peninsular India', *Indian Antiquary*, 1970, pp. 165-190.
3. *I.A.R.*, 1960-61, p. 168.
4. Paddaya, *op. cit.*, p. 168.
5. Sankalia *op. cit.*, p. 222 ff.
6. For details, see Ghosh, Asok K., 'The Palaeolithic Cultures of Singhbhum', *Transactions of the American Philosophical Society*, Vol. 60, Part I, 1970.
7. Sankalia, *op. cit.*, pp. 224-226 ; also see Wakankar, V.S., *op. cit.*
8. Sankalia, *op. cit.*, pp. 226-228.

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culture. From the point of view of techno-typology the industries of Patne II C and II D, representing the later phases of the Upper Palaeolithic, come somewhat nearer our industries. Both these phases of Patne have yielded industries containing some bladelets and fluted cores. The former has some penknife blades (c.f. obliquely truncated bladelets), while the latter is characterised by the occurrence of a few triangles, lunates and trapezes. There are also some burins, backed blades and those with marginal retouch in both the phases. A detailed typological account of the industry is not available to us, and so a complete comparative picture cannot be given at present. Sometime ago, Bridget Allchin and Goudie found an Upper Palaeolithic industry in the sand dunes at Visadi in Gujarat.[1] It is a small industry with some burins, scrapers and blades, etc., and does not show similarities with the industries of our region.

Thus, the sub-continent at the present has various sets of Upper Palaeolithic industries. They are hardly comparable with each other, point by point. It is quite likely that future work may group them under various cultures with different chronological positions and individual techno-typological characteristics. The industries of Southern Uttar Pradesh seem to form one such culture, although the possibilities of sub-groups and regional variations within this culture cannot be ruled out. At the moment they appear to be somewhat similar to the industries of Patne II C and II D phases.

Upper Palaeolithic phase appears to be very well represented in almost the whole of Europe, Africa and West Asia. A few industries have also been reported from China. The industries from America and Japan show entirely a different tool tradition, characterised by flat bifacially retouched tools.[2] It may be stated at the outset that it is not possible to find exact parallels of the Upper Palaeolithic industries of Southern Uttar Pradesh either in Europe, or Africa or West Asia, although blade-bladelet element dominates every where. Among the various Upper Palaeolithic cultures of Western Europe, covering a long period of the later half of the Wuerm, it is the later stages of the Magdalenian which exhibit some such features that may be noticed in our industries also. But, the Magdalenian industries are characterised by a large variety of bone and antler tools.[3] From Magdalenian II onwards one can notice considerable development of implements made on bladelets.[4] Backed and

1. Aillchin, B. and Goudie, A., 'Dunes Aridity and Early Man in Gujarat, Western India', *Man*, Vol. 6, 1971, pp. 248-265.
2. Bordes, F., *The Old Stone Age*, pp. 210-219. For America, also see Mueller-Karpe, H. *op. cit.*, pp. 110-112.
3. For example, the industry coming from the earlier layers of the Cave at Rochereil in France contains not only a large variety of bone and antler tools, out a good number of lithic implements, made on long thick blades and thick flakes. For details, see Jude, P.E., *La Grotte de Rochereil*, Memoir 30 of the Archives de l' institute de Paleontologie Humaine, Paris, 1960.
4. Bordes, F., *op. cit.*, p. 163.

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denticulated bladelets and a few scalene triangles constitute the important features of this phase. All the three appear in the industries of our region also. But the tools like burins and end scrapers made on thick blades and flakes in the later phases of the Magdalenian are generally absent in our region. On the whole, the lithic industry of the Magdalenian II compares fairly well with our industries. Mention may also be made of a lesser known culture of south-east France, named Salpetrien, after the type-site la Salpetriere, or Rhodanien, after the river Rhone.[1] Chronologically, the culture is slightly earlier than the Solutrean. The diagnostic feature of the Salpetrien culture is the occurrence of bladelets and microliths, which appear in a good proportion in the industries of our region also. Some of the Upper Palaeolithic industries of the Kostienki-Borchevo group found near the river Don in the Soviet Union show some points of agreement with the industries of Southern Uttar Pradesh. According to Rogachev,[2] the assemblage found in the layer 2 at Telmanskaya contains a good number of denticulated blades, retouched blades, backed blades and backed bladelets, including Micro-Gravettes. There are also some microlithic forms. End scrapers are rare. Evidently the industry exhibits many features which are found in those of our region as well.

In Africa[3], the evidence for the Upper Palaeolithic cultures is less adequately studied. The Ibero-Maurusian culture of the Maghreb[4] and Silsilan of Egypt[5] (C^{14} date—13,360 ± 200 B.C.) are characterised by a considerable number of tools made on bladelets, including a few microliths. These features bring them nearer our own industries. The Upper Palaeolithic cultures of South Africa—Lupembam, Stillbay and Pietersburg[6]—hardly show major point of similarities with our industries, since they all contain a large quantity of big flake-tools like bifacial point and typical side scraper, etc., besides picks, chisels and adzes.

In West Asia, the industries of Zarzi cave in Iraq and that found in layer B of Shanidar cave[7] consist of backed blades, bladelets, notched tool and microliths like lunate and scalene triangles. All these types occur also in the industries of Southern Uttar Pradesh. The various Aurignacian and Aurignacoid industries of West Asia,

1. Bordes, F., in *Vorgeschichte* (ed. Alimen, Marie-Henriette and Steve, P. Marie-Joseph), Weltgeschichte, Band 1, Frankfurt, 1966, p. 60.
2. Referred to in Bordes, F., *The Old Stone Age*, p. 188 ff.
3. *Ibid.*, p. 204 ff.; and also see various chapters of Alimen, H. *The Prehistory of Africa*. For details of the Upper Palaeolithic Cultures of Maghreb, see Tixier, J., *Typologie de l 'Epipaleolithique du Meghreb*, Paris, 1963.
4. For typology and other details, see Alimen, H., *op. cit.*, p. 61 ff.
5. This culture has been recently identified by Dr. Philip Smith, referred to by Bordes, F., *op. cit*,, p. 206.
6. For details, see Clark, J.D., *The Prehistory of Southern Africa*, London, 1959; Alimen, H., *op. cit.*, p. 290 ff. ; Sampson, C.G., *The Stone Age Archaeology of Southern Africa*, pp. 151-291.
7. Bordes, F., *op. cit.*, p. 198.

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like those of Ksar' Akil in Lebanon, Yabrud in Syria, and Kara-Kamar in Afghanistan,[1] do not bear much resemblance with our industries.

The presence of tools made on bladelets, including a few microliths, and a rather poor representation of good blade-implements and well made burins may be regarded as some of the fundamental features of the Upper Palaeolithic industries of Southern Uttar Pradesh. These features appear in many of the European, North African and West Asian Upper Palaeolithic cultures also. All of them do not belong to one time-bracket. Taking into consideration the evidence provided by these cultures, it can be argued that the presence of microliths and tools made on bladelets dose not necessarily suggest a late date. Looking at the techno-typological similarities, the C^{14} date of the gravel III of the Belan (about 20,000 B.P.), which corresponds roughly with the beginning of the Magdalenian culture in West Europe, may probably be given to most of the Upper Palaeolithic industries of Southern Uttar Pradesh. There may be, however, some industries in our region which are slightly later in time, *e.g.*, the Lahariadih industry, with very developed bladelet element. It may be recalled that Sharma claimed to have found an industry in the stratum lying just above the gravel III of the Belan, which is characterised by blades and burins as well as non-geometric microliths.[2] If the view that the buried soil which yielded this industry marks the end of the Pleistocene is correct, then we have evidence for another Upper Palaeolithic (or Epi-palaeolithic) industry in the Belan region, chronologically later than the other one, coming from the gravel III. The evidence from Chopani-Mando seems to confirm this.[3] However, it must be borne in mind that this chronology is almost entirely based upon only two C^{14} determinations, and that too on the basis of fresh water shells, presumably impregnated by calcium carbonate.

As emphasised earlier in the Chapter II and elsewhere, there is hardly any justification for suggesting a continuous sequence of palaeolithic cultures in Southern Uttar Pradesh which may imply a gradual unilinear evolution. We failed to find any field evidence either in the Belan-Seoti valley or elsewhere, which may support such a hypothesis. A hypothesis of this nature would have been received very well in the later half of the nineteenth century, a period of culture-evolutionists. The researches of the twentieth century have clearly revealed the complexities of culture-processes and the fact that cultures hardly grow in set patterns.[4] It is likely that future work may establish some links among some of the palaeolithic cultures of our region, but, for the present, it is advisable to treat them as separate cultures, unconnected with each other.

1. *Ibid.*, pp. 198-200.
2. Sharma, G.R., 'Stone Age in the Vindhyas and the Ganga Valley', *Radiocarbon and Indian Archaeology*, (ed. Agrawal and Ghosh), p. 108.
3. Sharma, G.R., *et al , Beginnings of Agriculture*, pp. 33-76.
4. For details, see Evans-Pritchard, E.E., *Social Anthropology*, London, 1969, (Paper-back edition), pp. 1-108.

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PLATES

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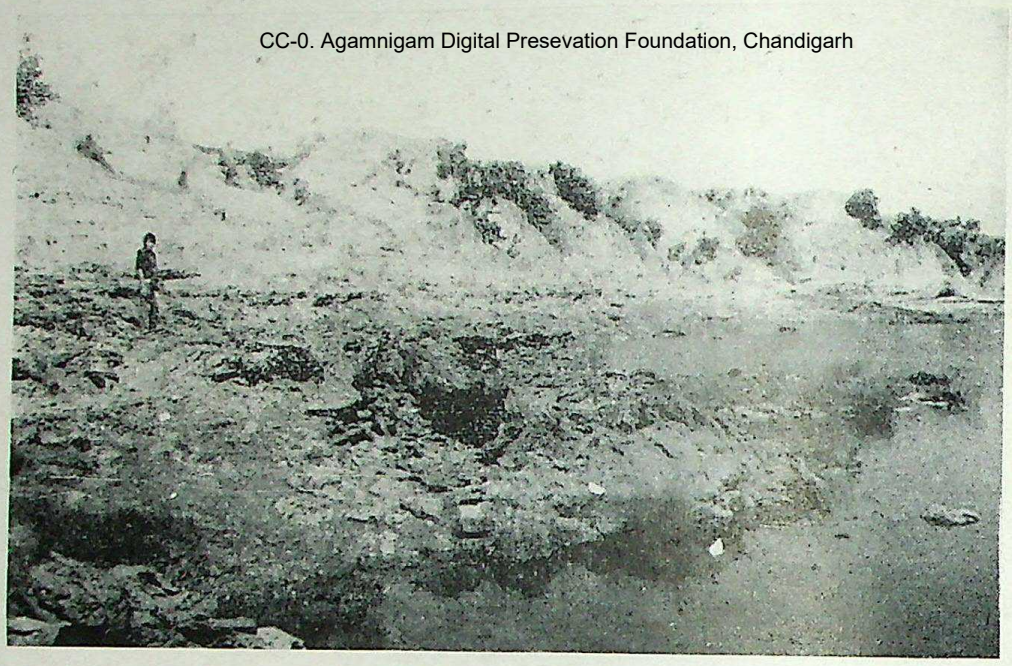

I A. General view of the Belan section near Bansghat

I B. A close view of the boulder-cobble deposit near Bansghat on the Belan

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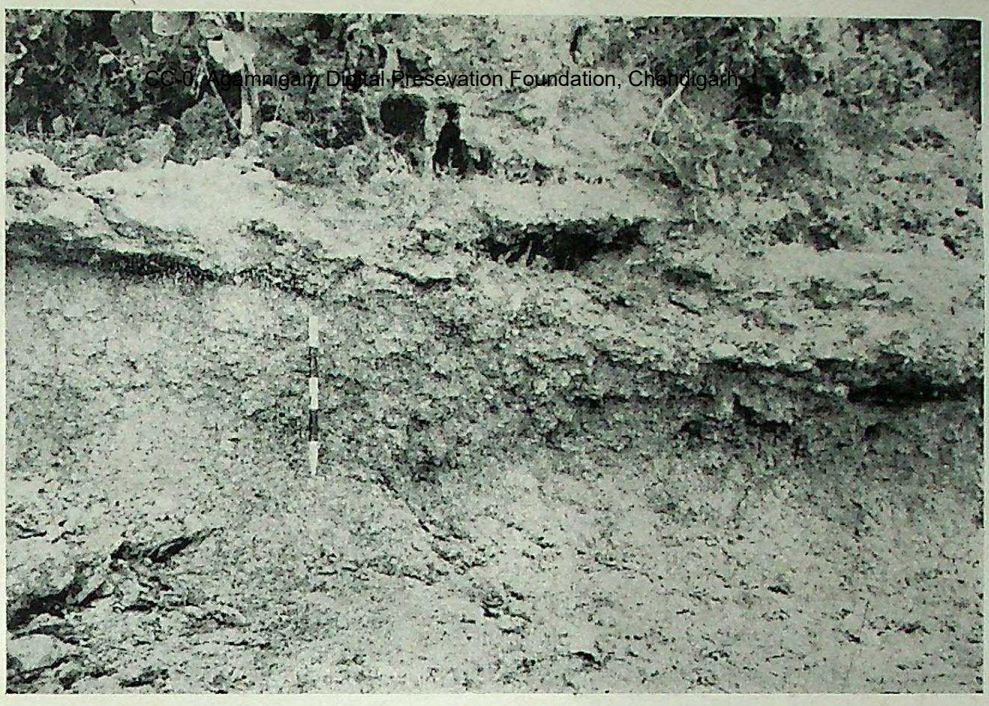

II A. A view of mottled clay of underlying Gravel-sand deposit of the Belan section

II B. A view of the gravel-sand deposit with evidence for cross-bedding on the Belan

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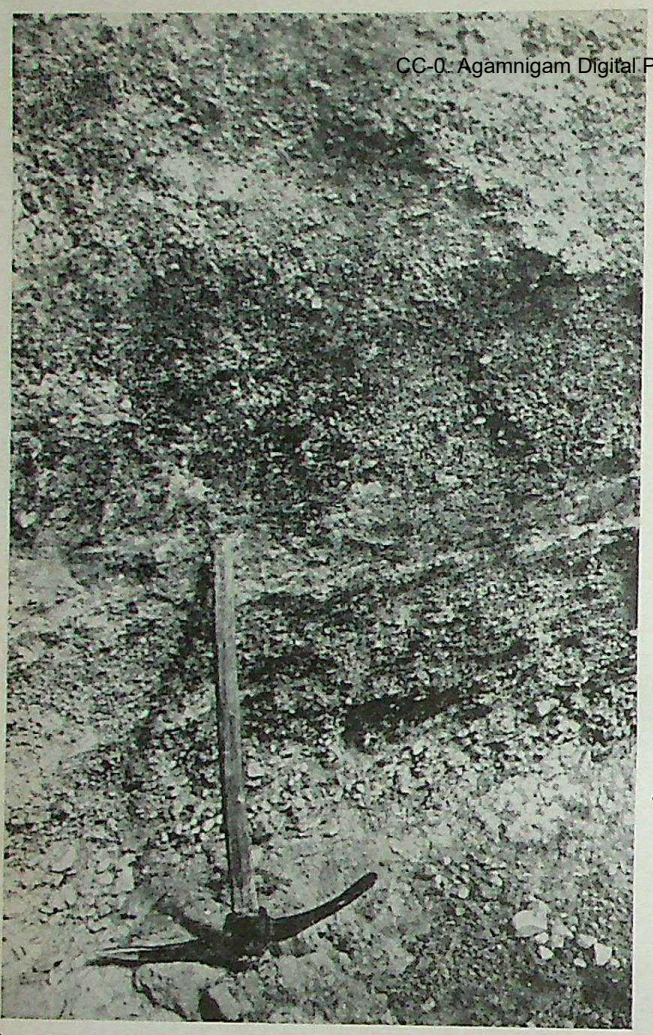
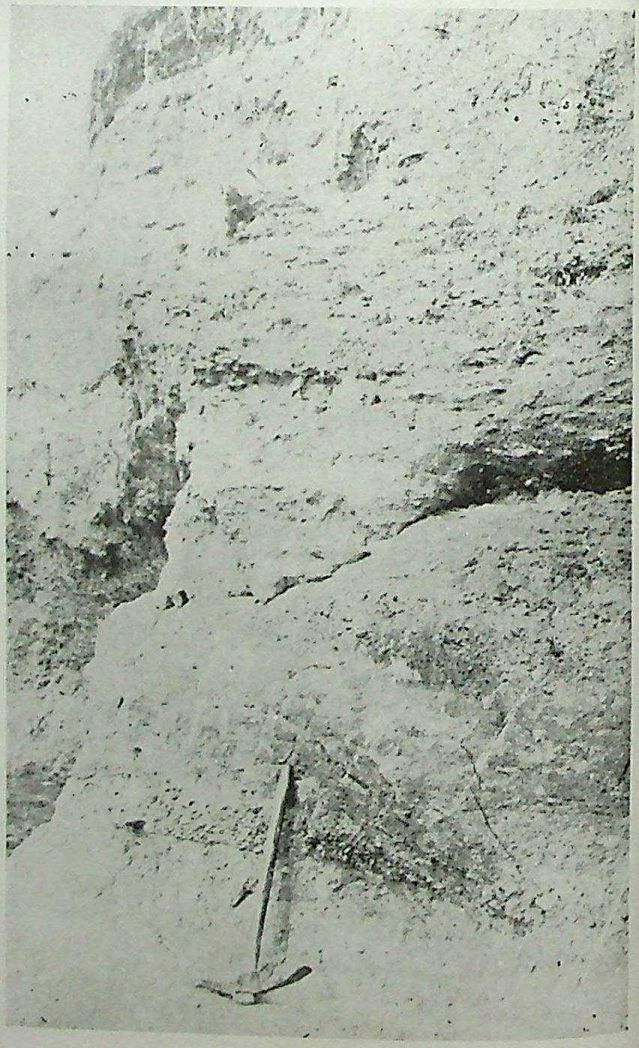


III A. A view of thick gravel-sand deposit on the Seoti

III B. Another view of gravel-sand deposit on the Seoti, with evidence for cross-bedding



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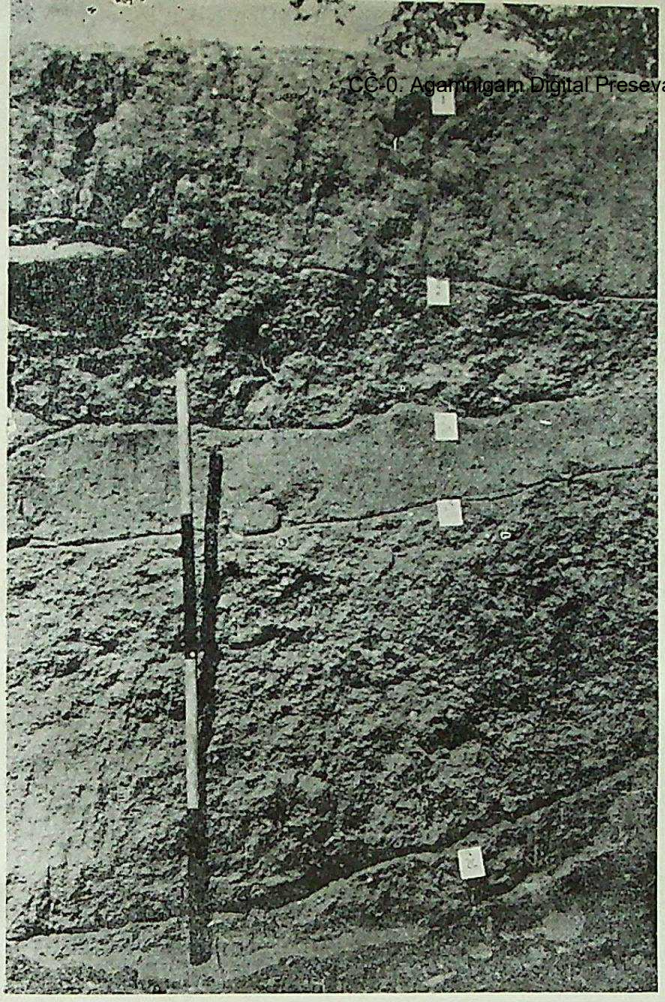
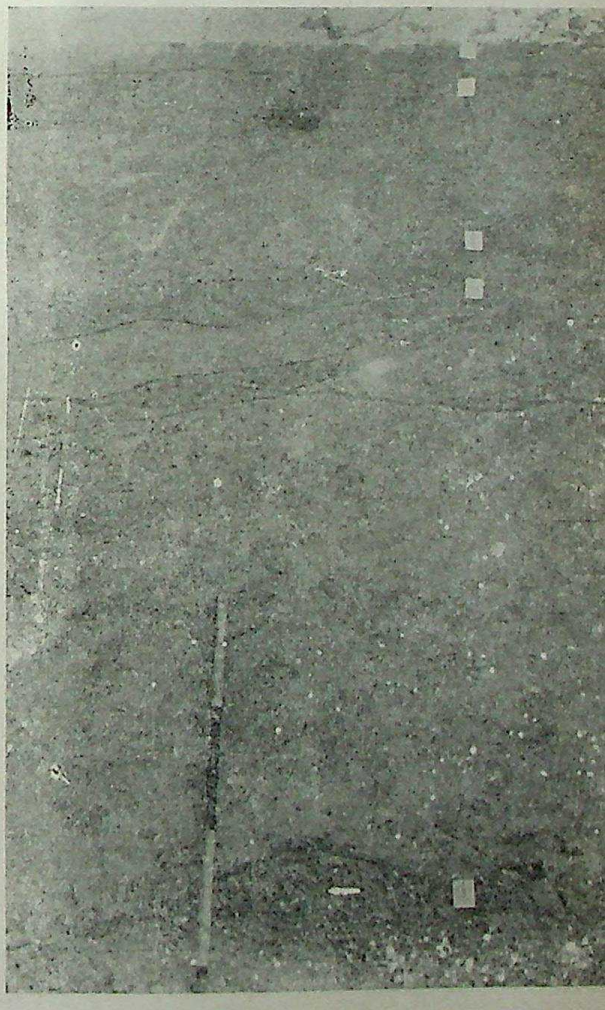
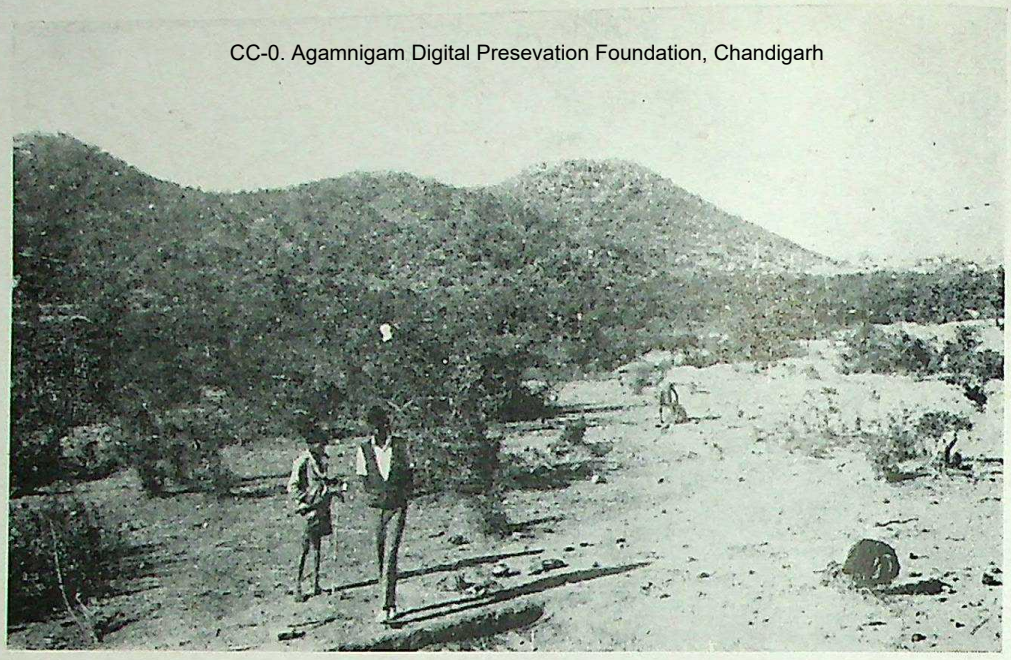


IV A. A close view of Gravel III at Daiya on the Seoti, with evidence for intervening bands of sand

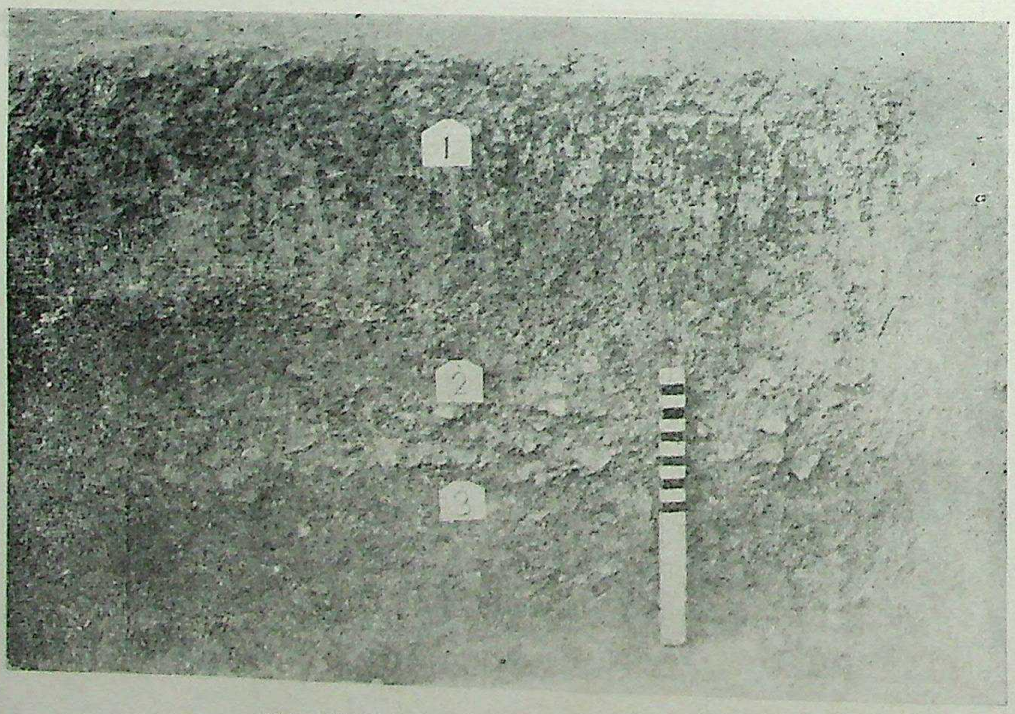
IV B. A view of excavated section at Daiya, showing alluvium and underlying Gravel III



CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

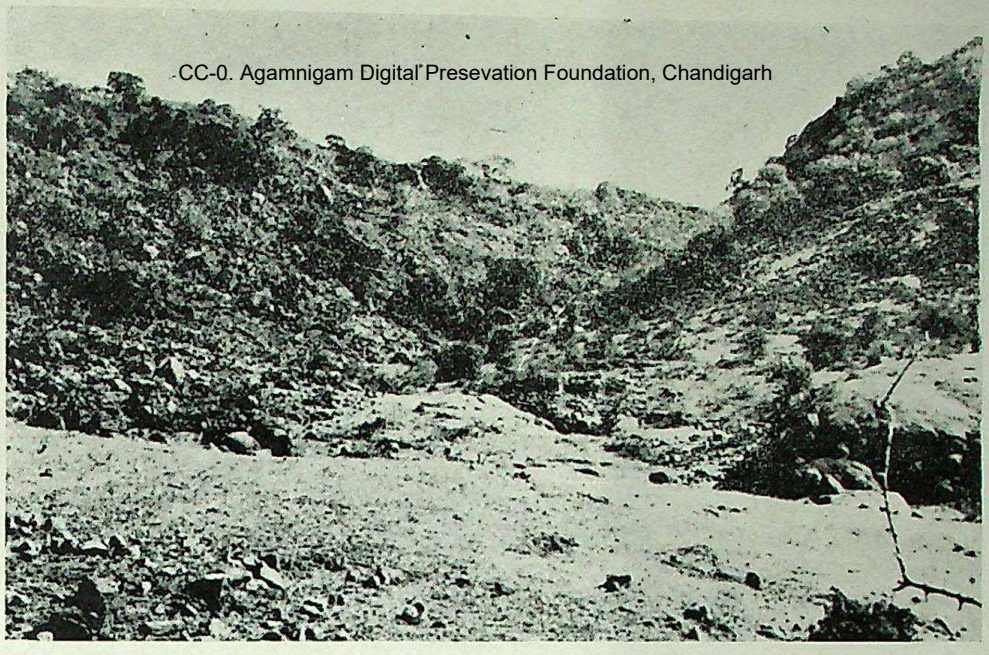


V A. A view of the Bankesiddha valley near Siddhapur, District Banda



V B. Section of the Bankesiddha valley

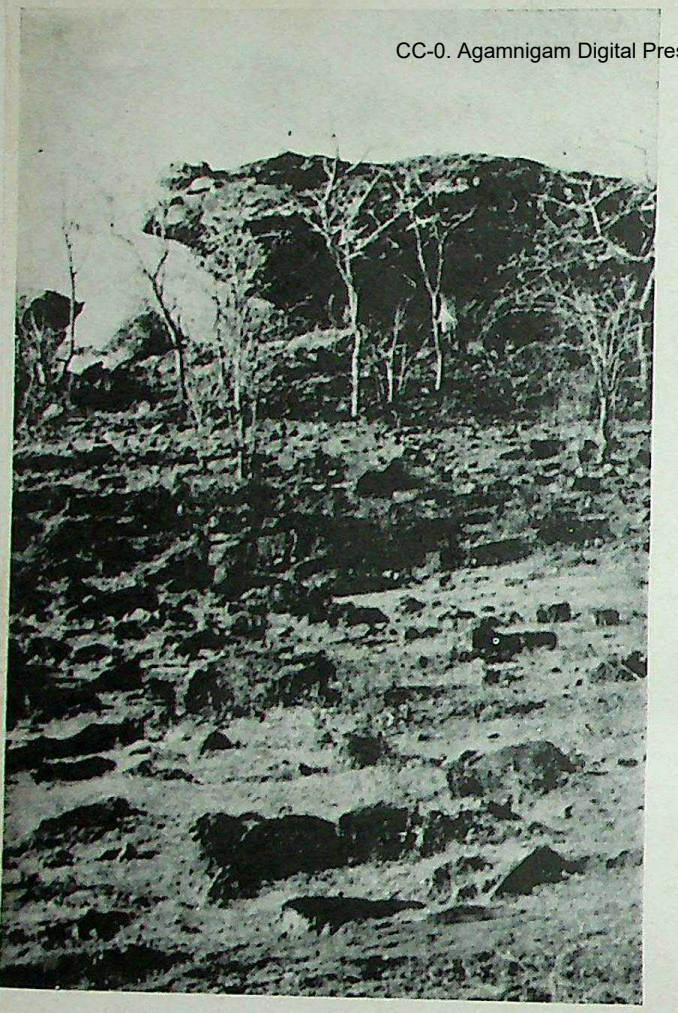
CC-0. Agamnigam Digital Presevation Foundation, Chandigarh



VI A. A view of eastern hill at Lahchura

VI B. Section on the Dhasan at Lahchura

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh



VII A. A view of the rock-shelter at Lahariadih

VII B. Section of the deposit of Lahariadih rock-shelter

LAHCHURA -1

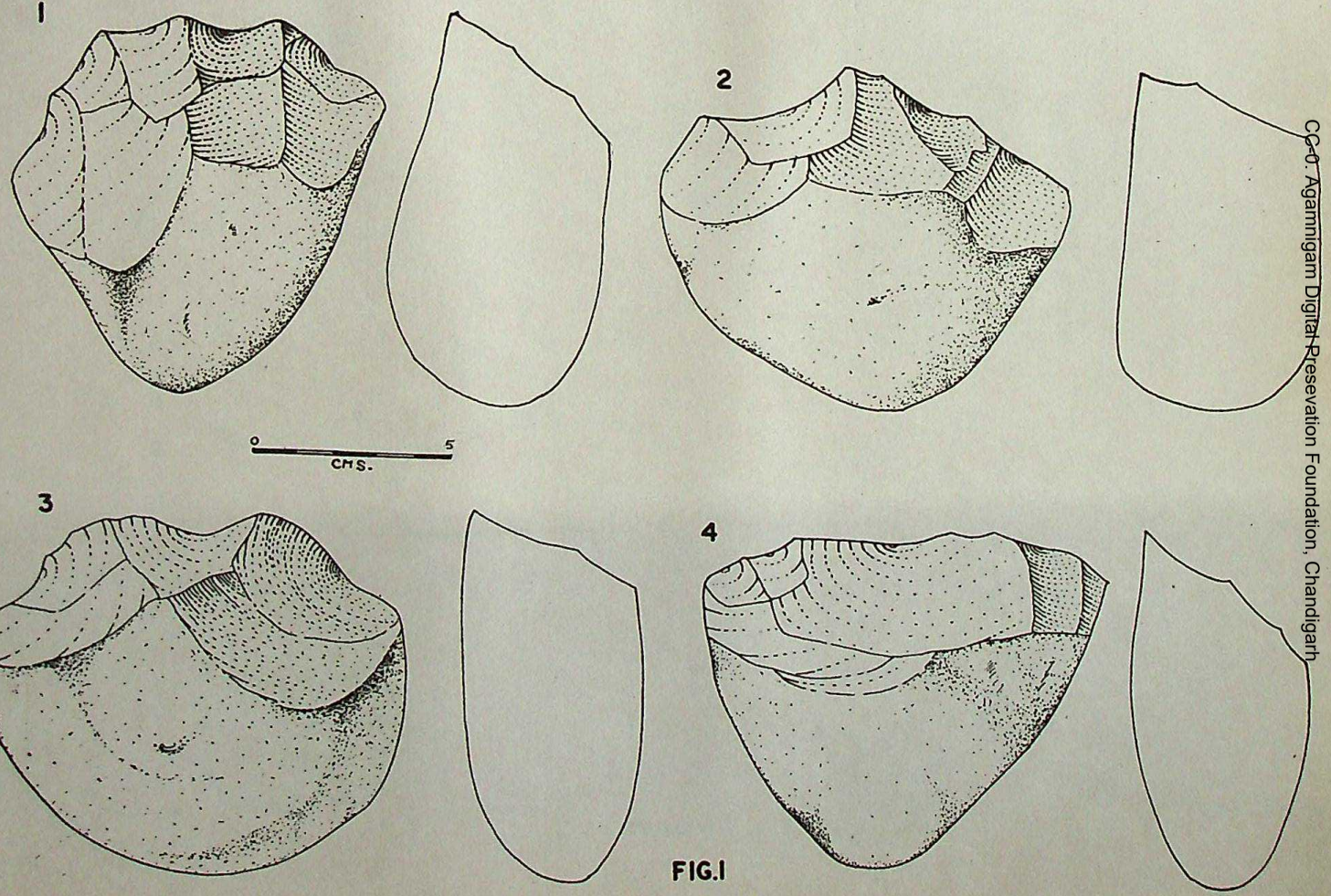
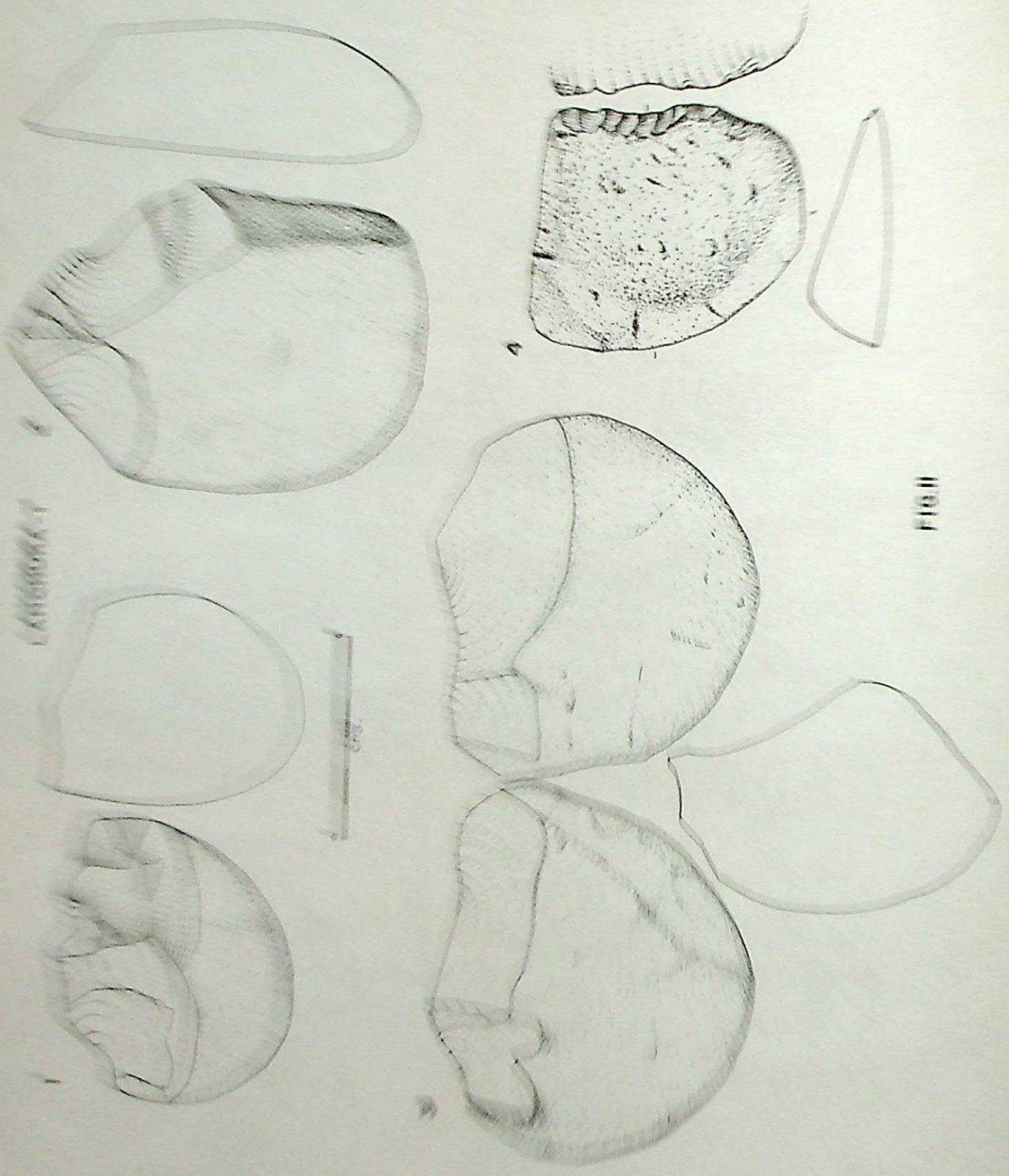


FIG.1

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh



LAHCHURA-I

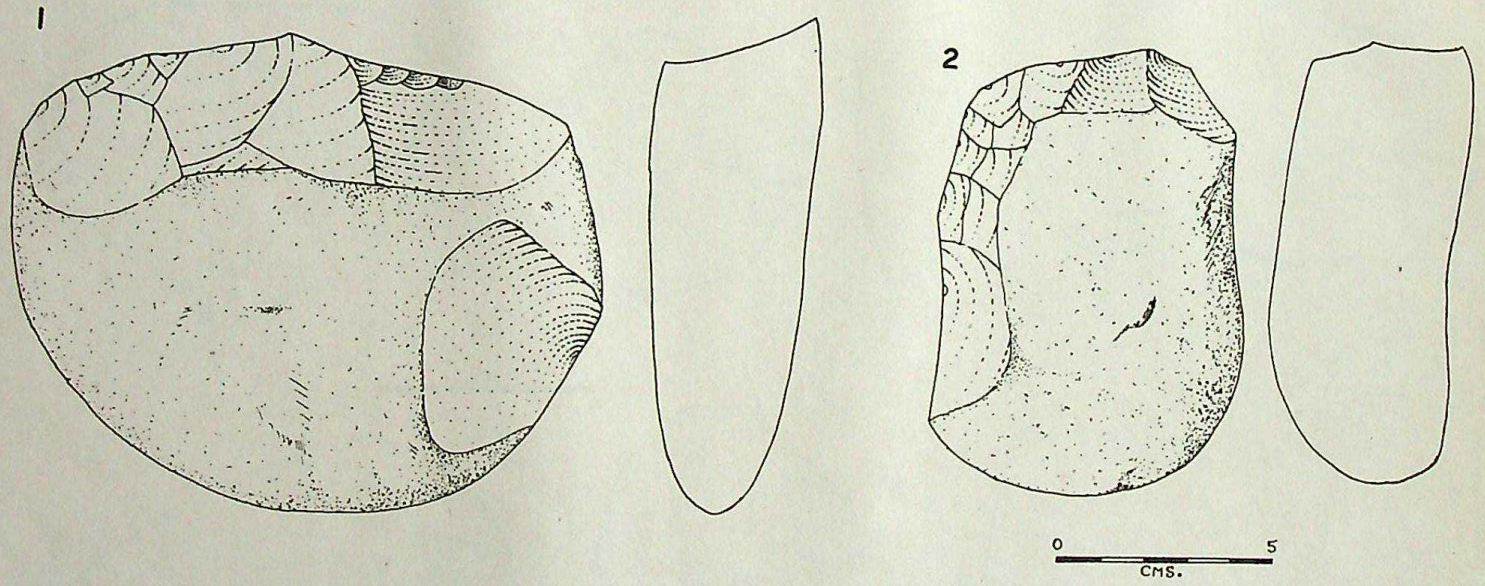


FIG.III

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

FIG.II

LAHCHURA-I

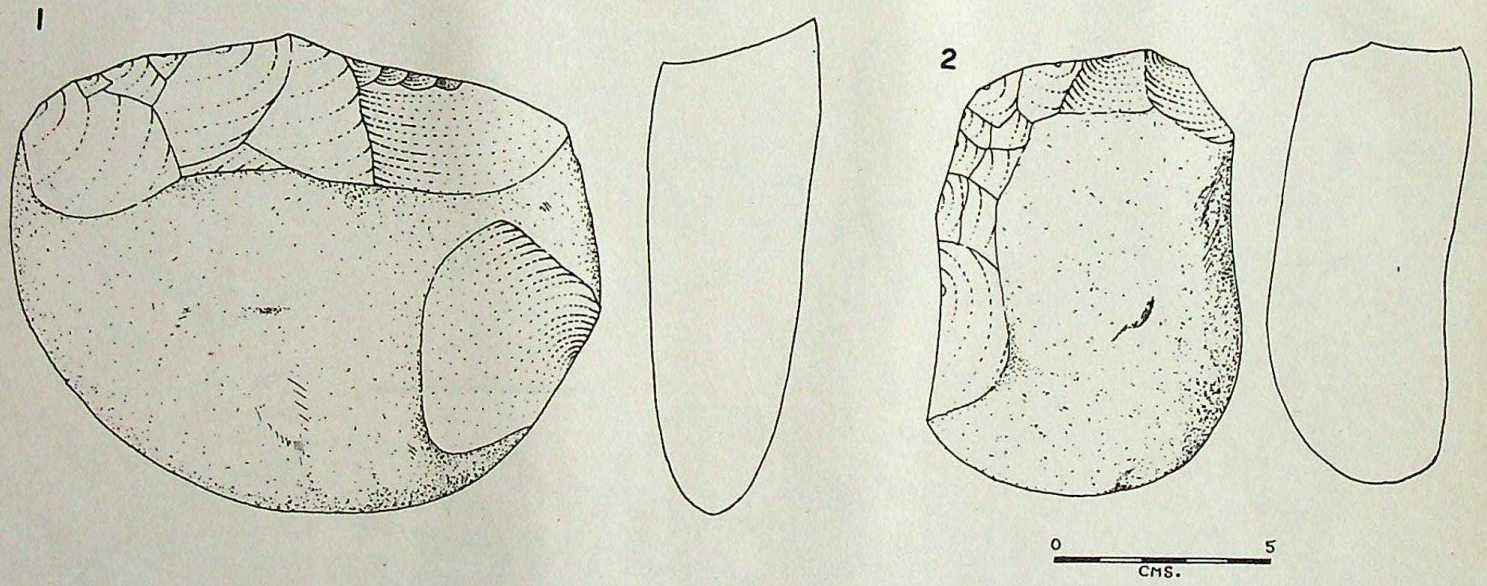


FIG.III

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

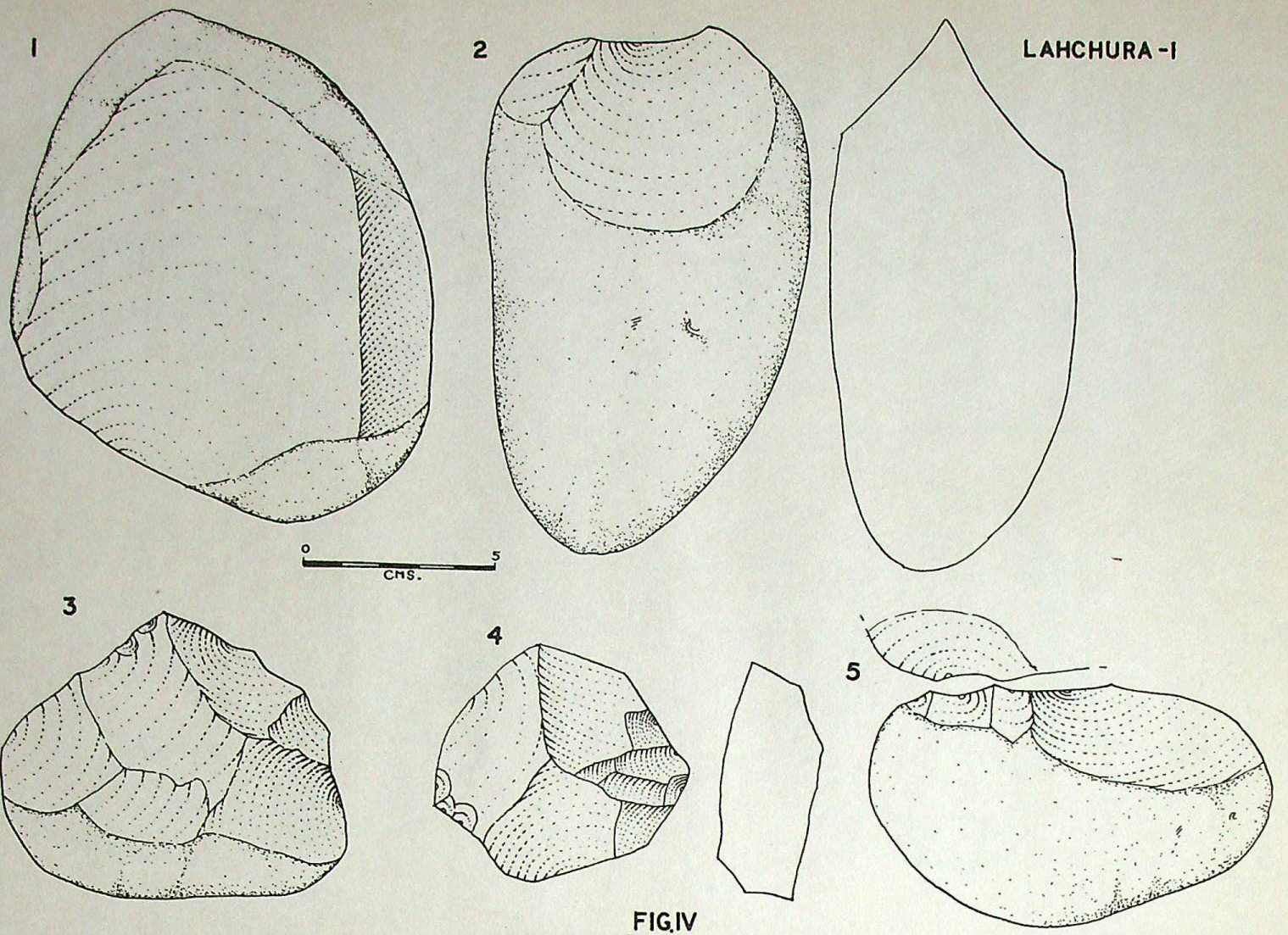


FIG.IV

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

LAHCHURA -I

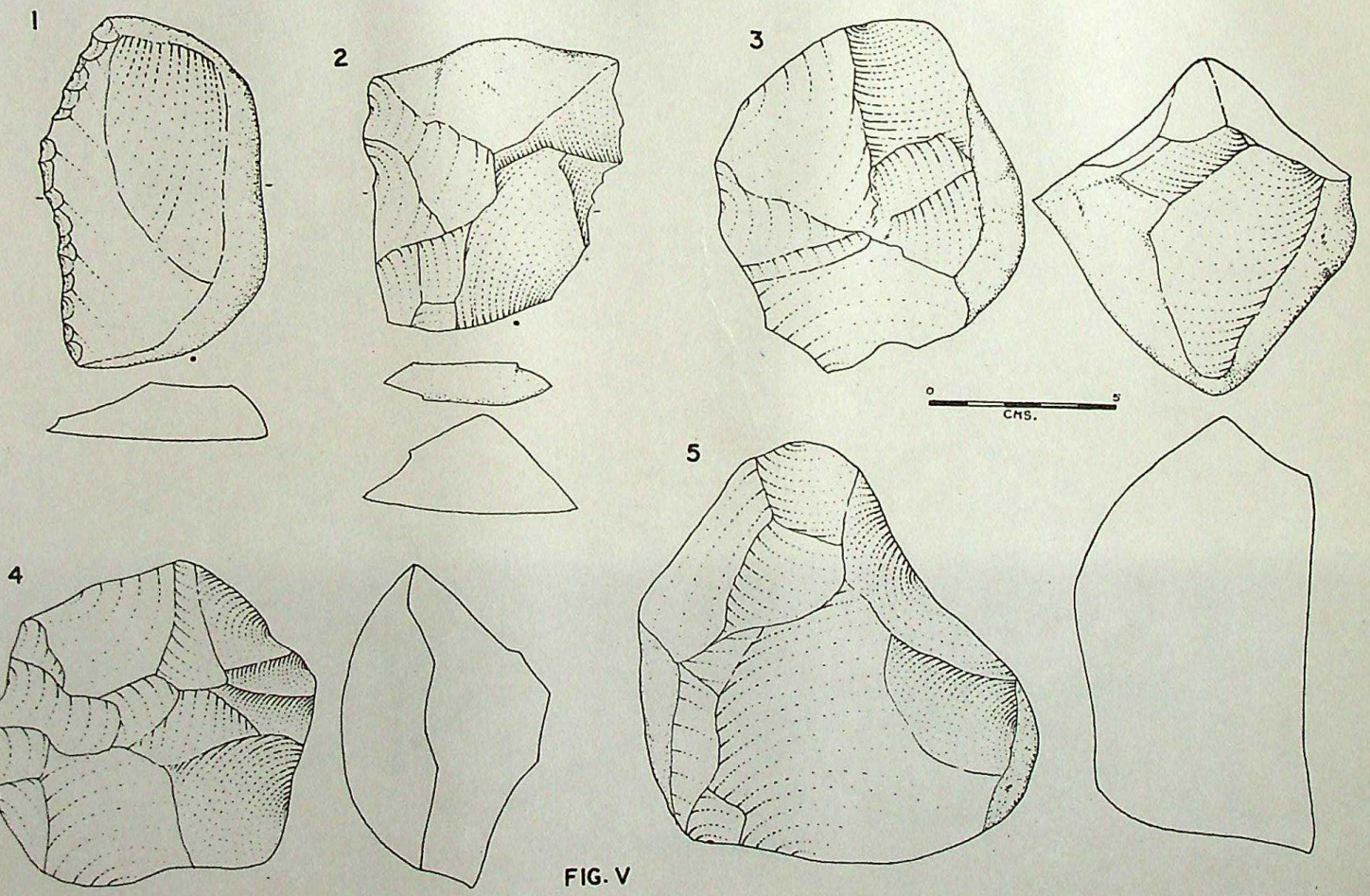


FIG. V

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

BANGAWAN

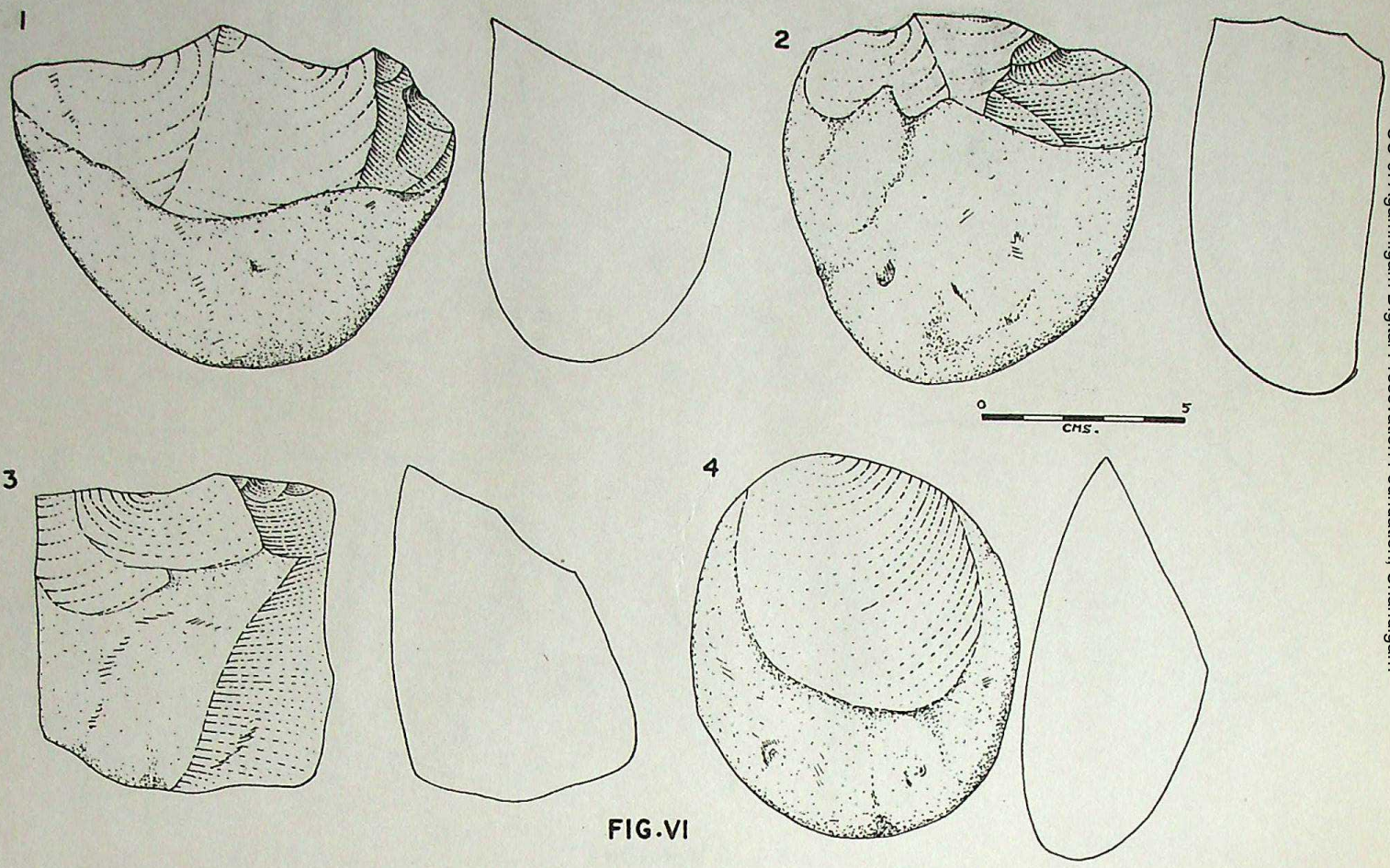


FIG.VI

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

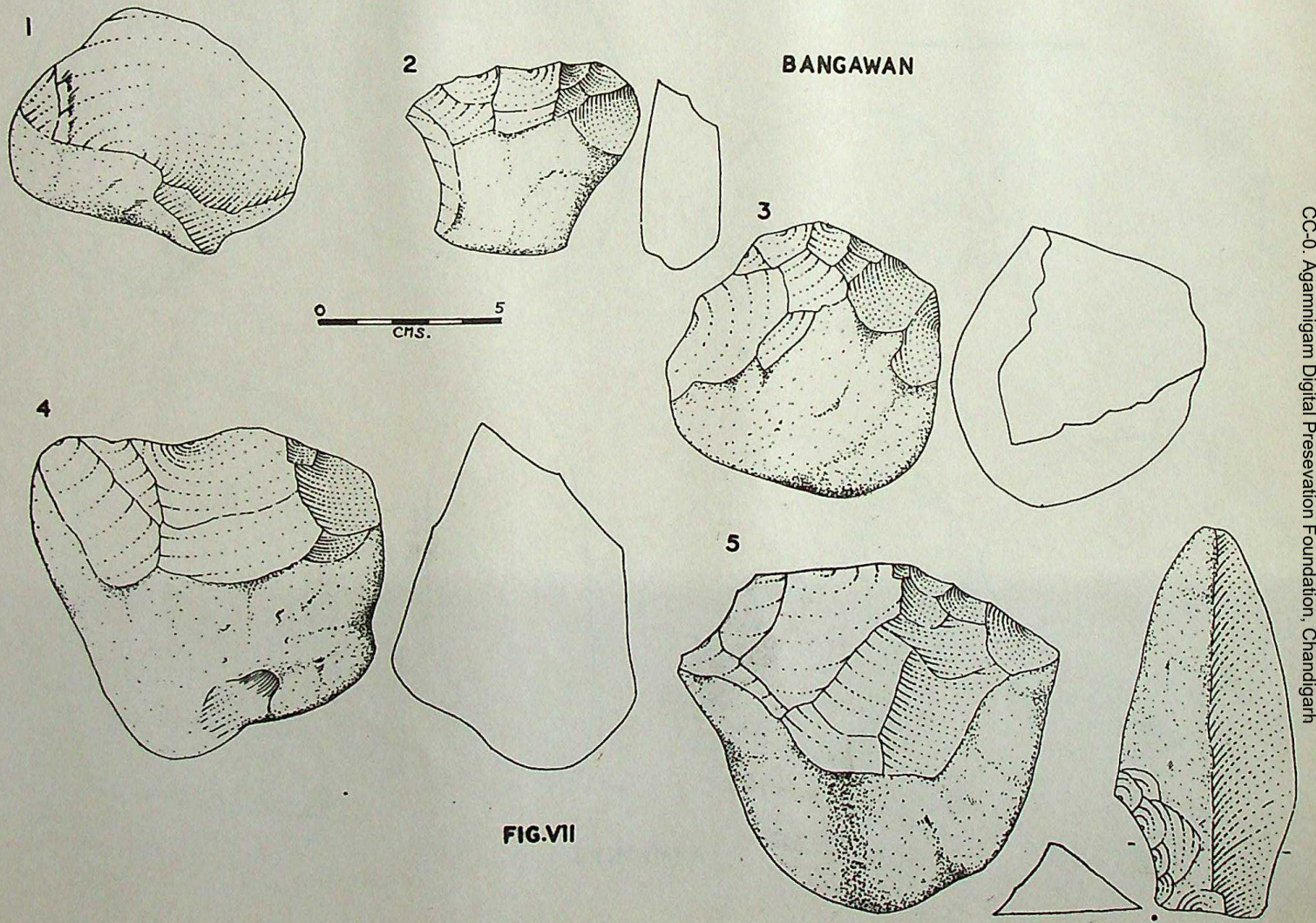


FIG.VII

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

BANGAWAN

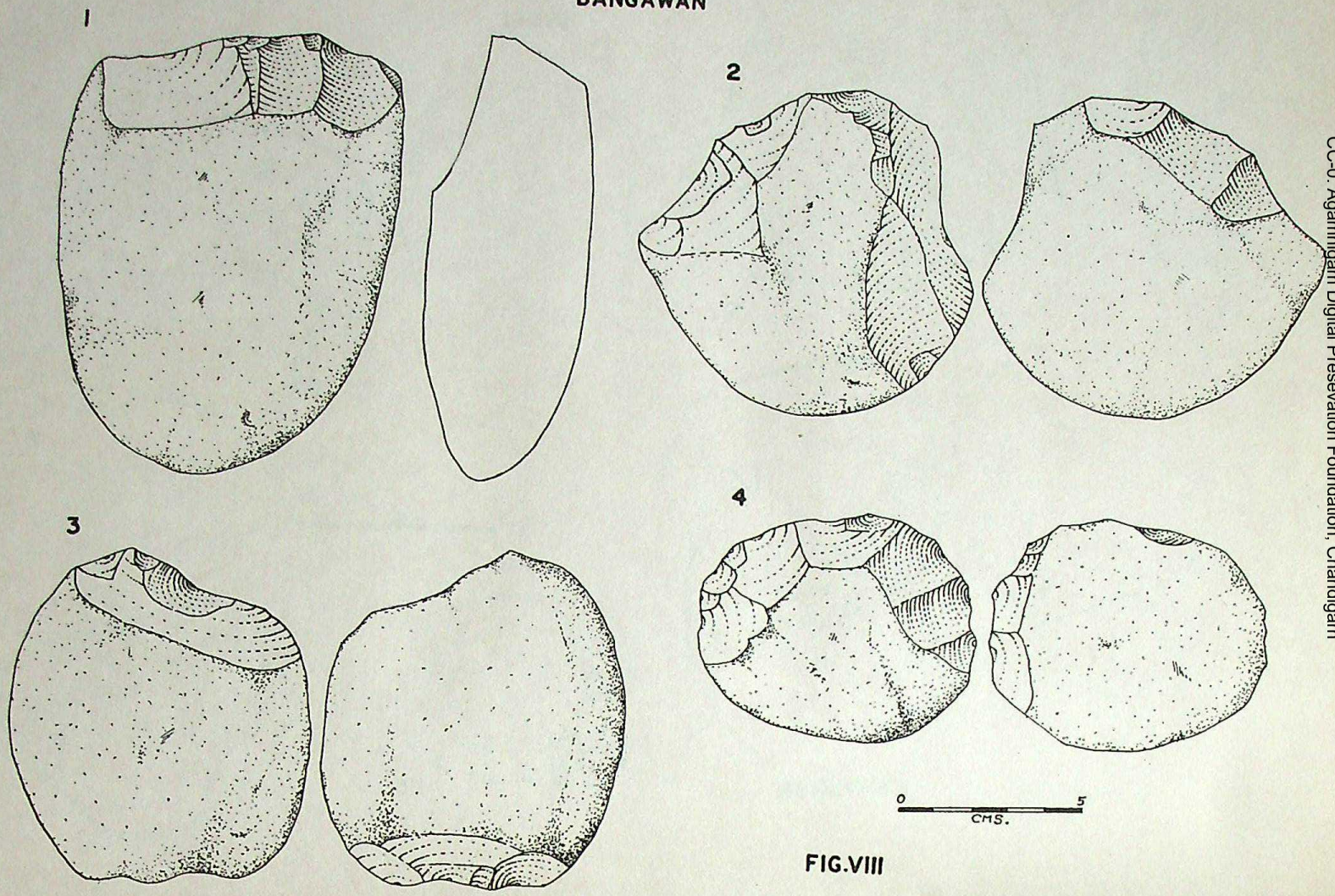


FIG.VIII

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

BELHARKA

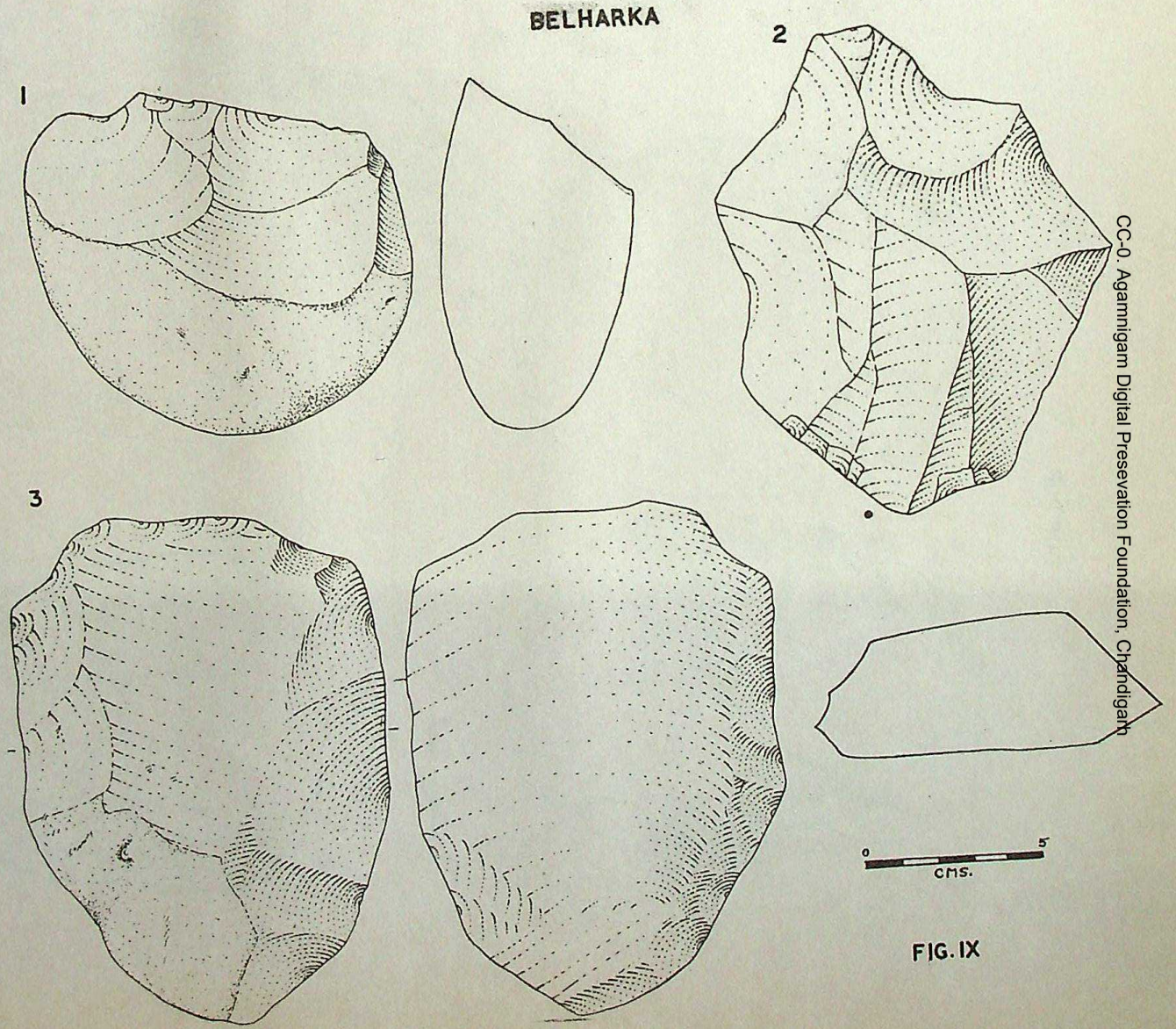


FIG. IX

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

GOPIPUR

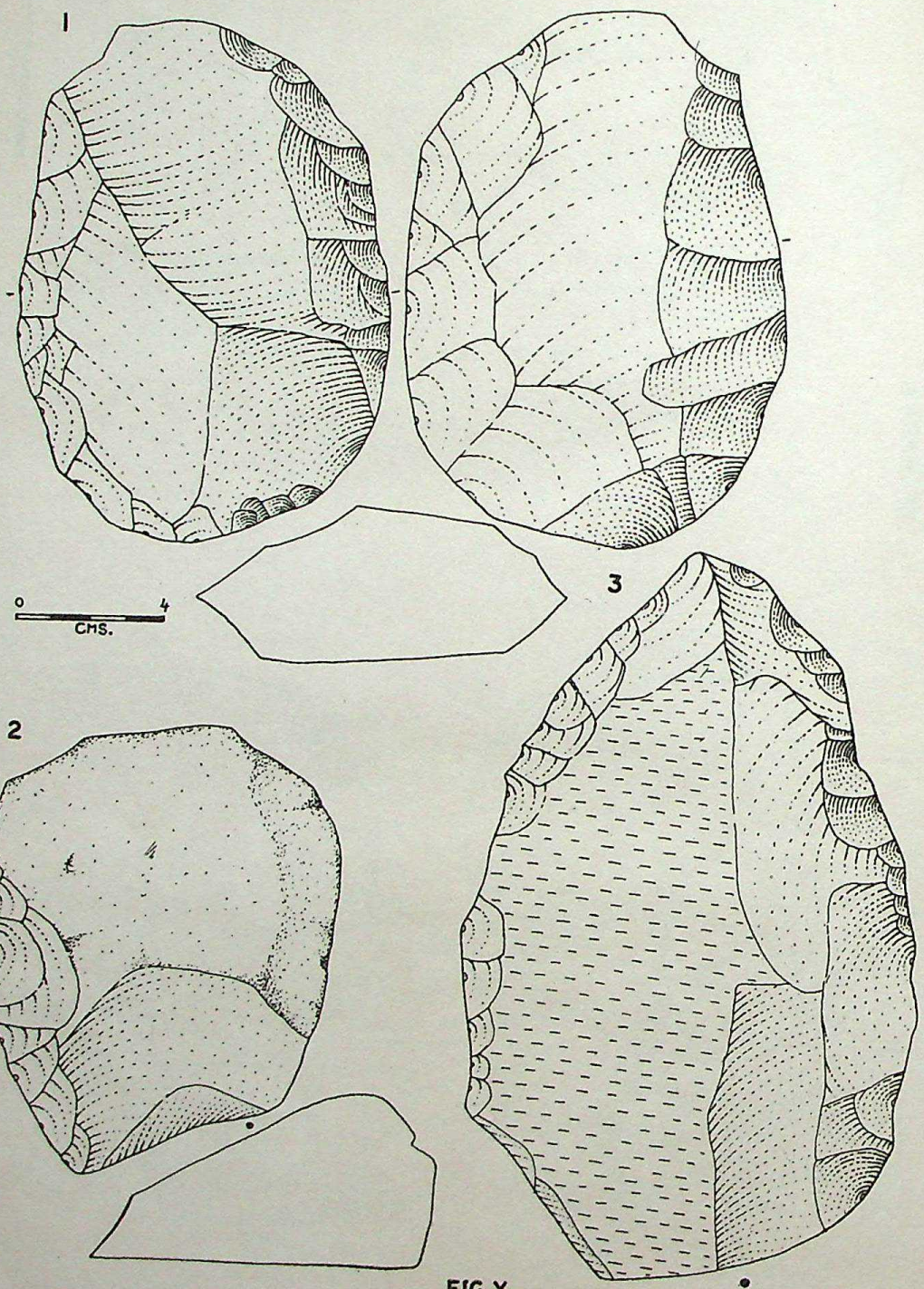
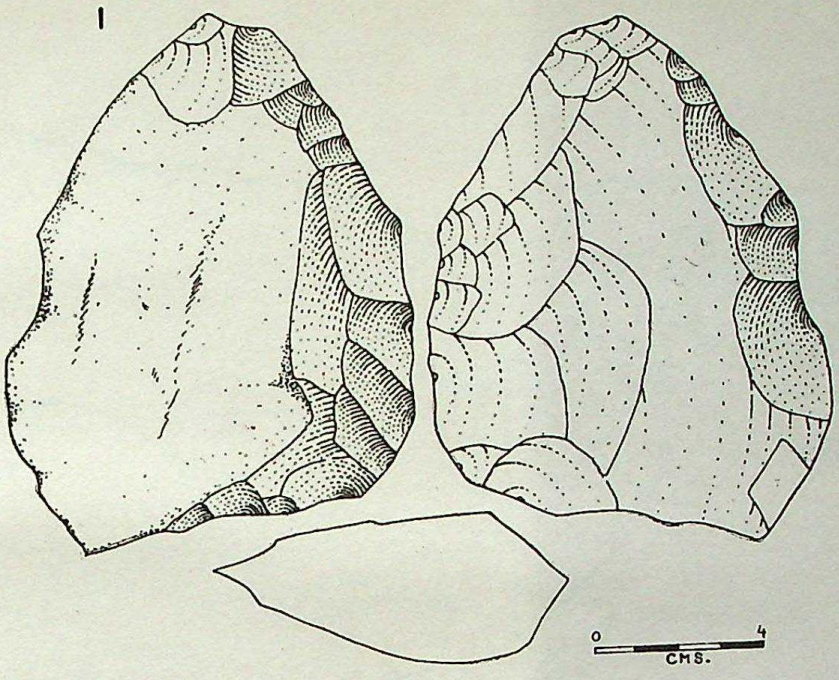


FIG.X

CC-0. Agamnigam Digital Preservation Foundation, Chandigarh

GOPIPUR



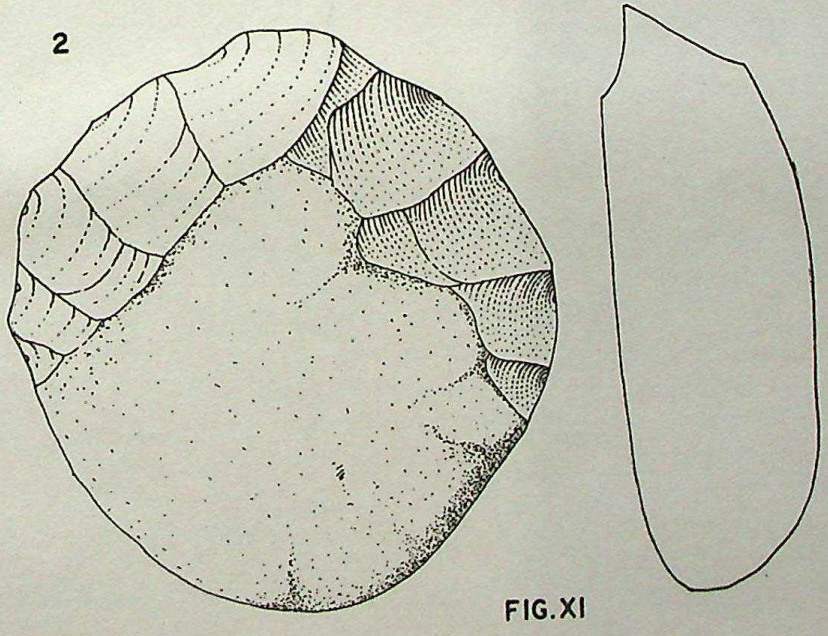


FIG. XI

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

FIG. XII

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

FIG. XIII

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

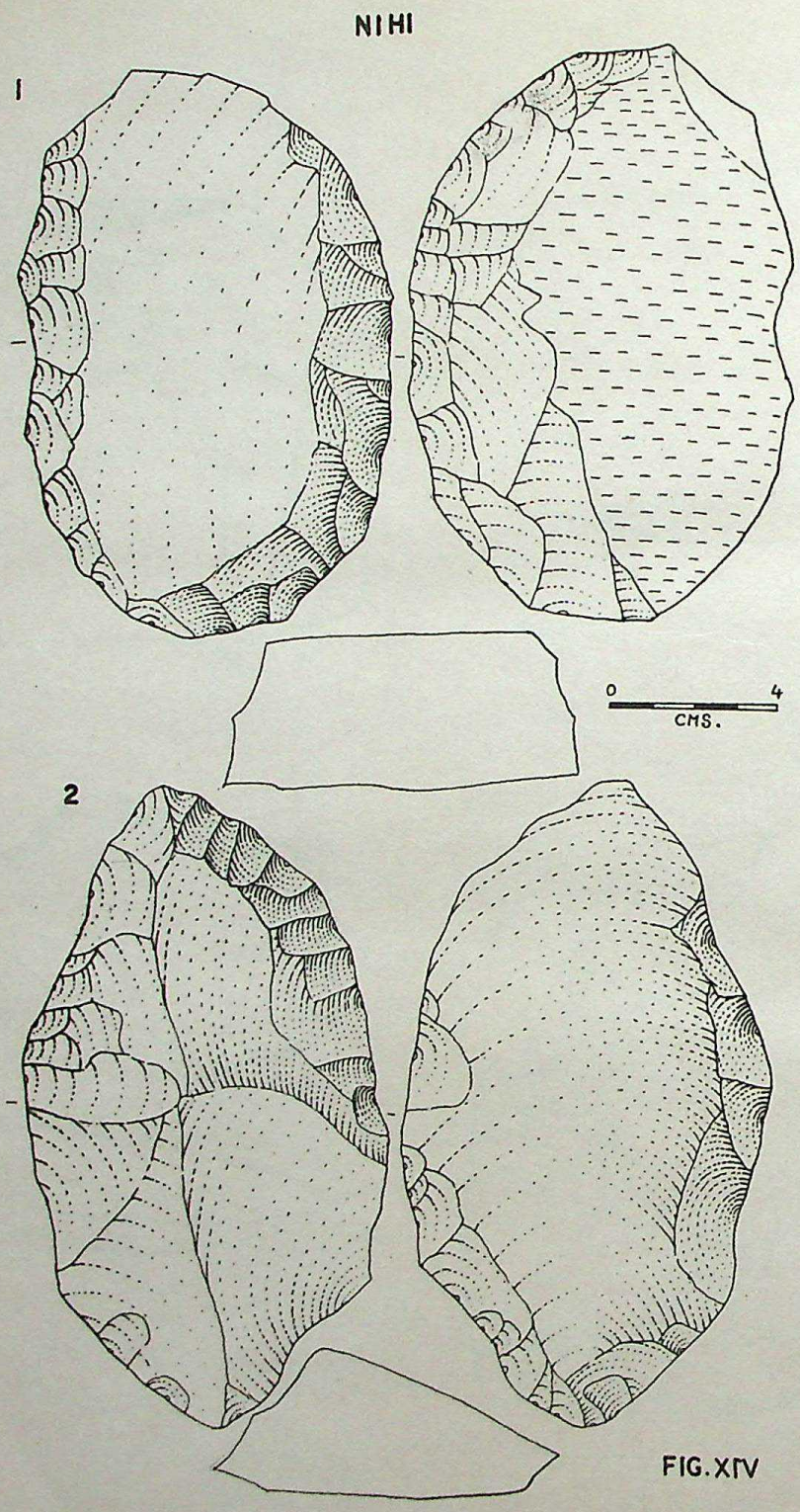


FIG. XIV

NIHI
CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

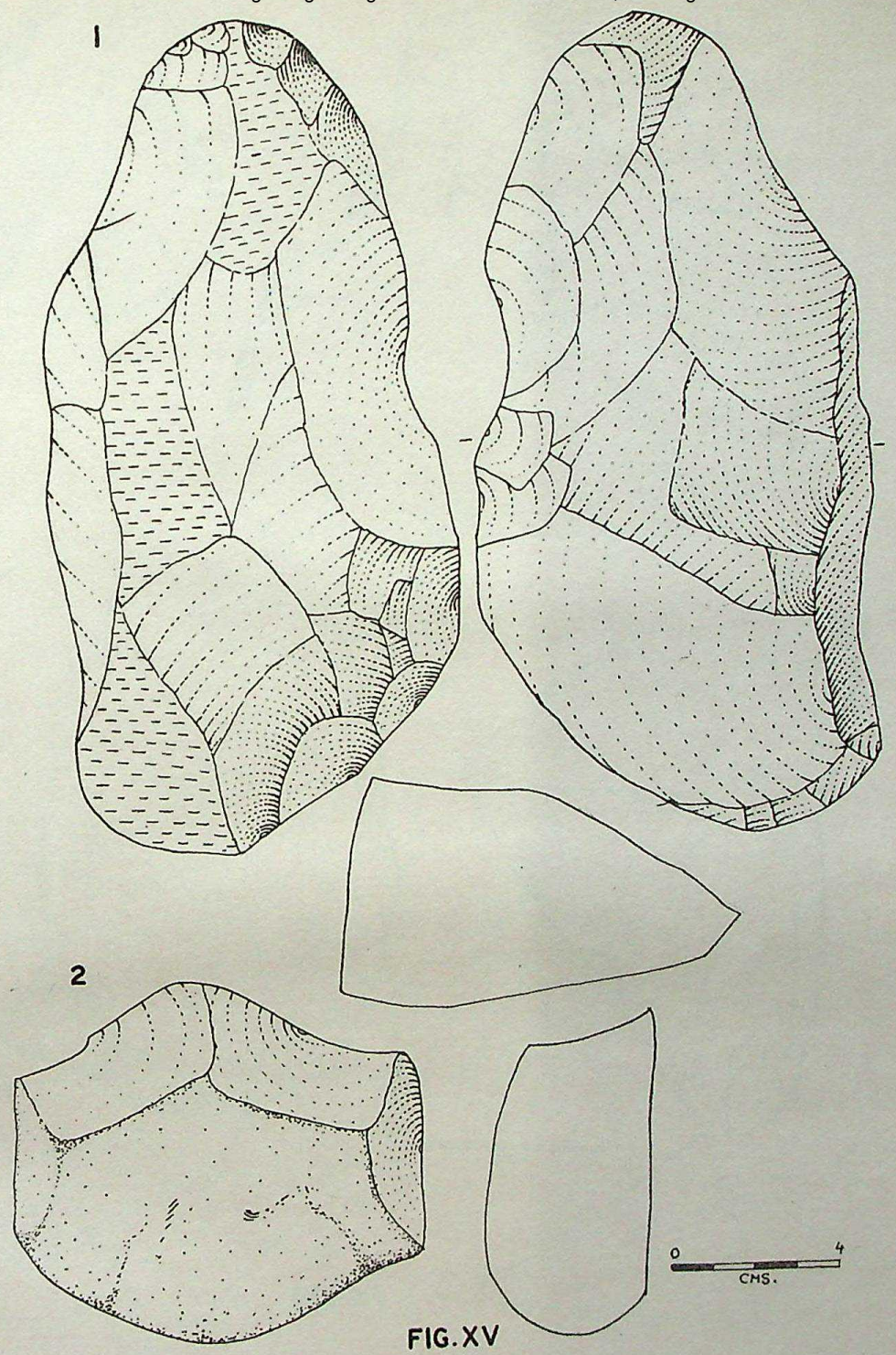


FIG. XV

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

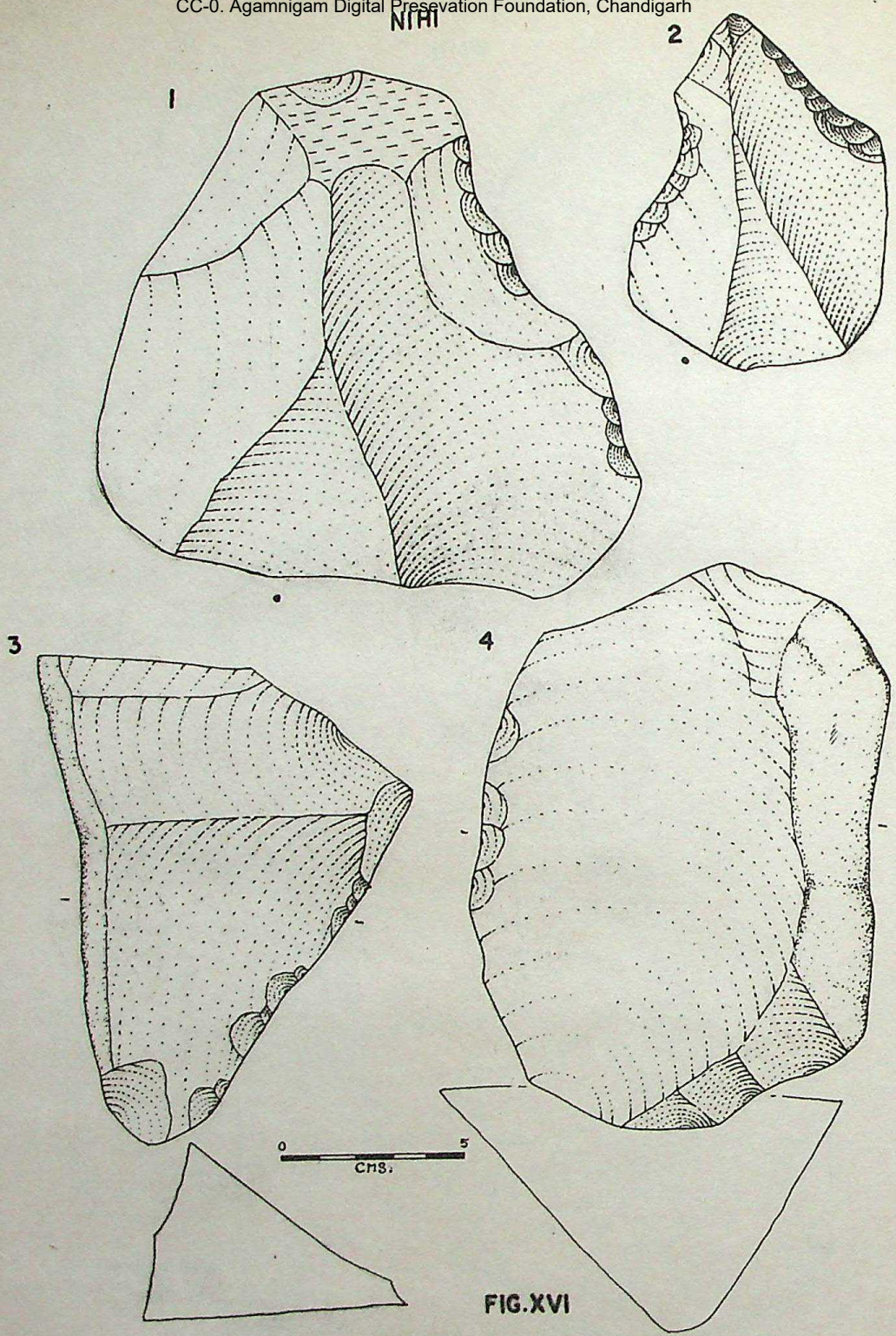


FIG.XVI

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

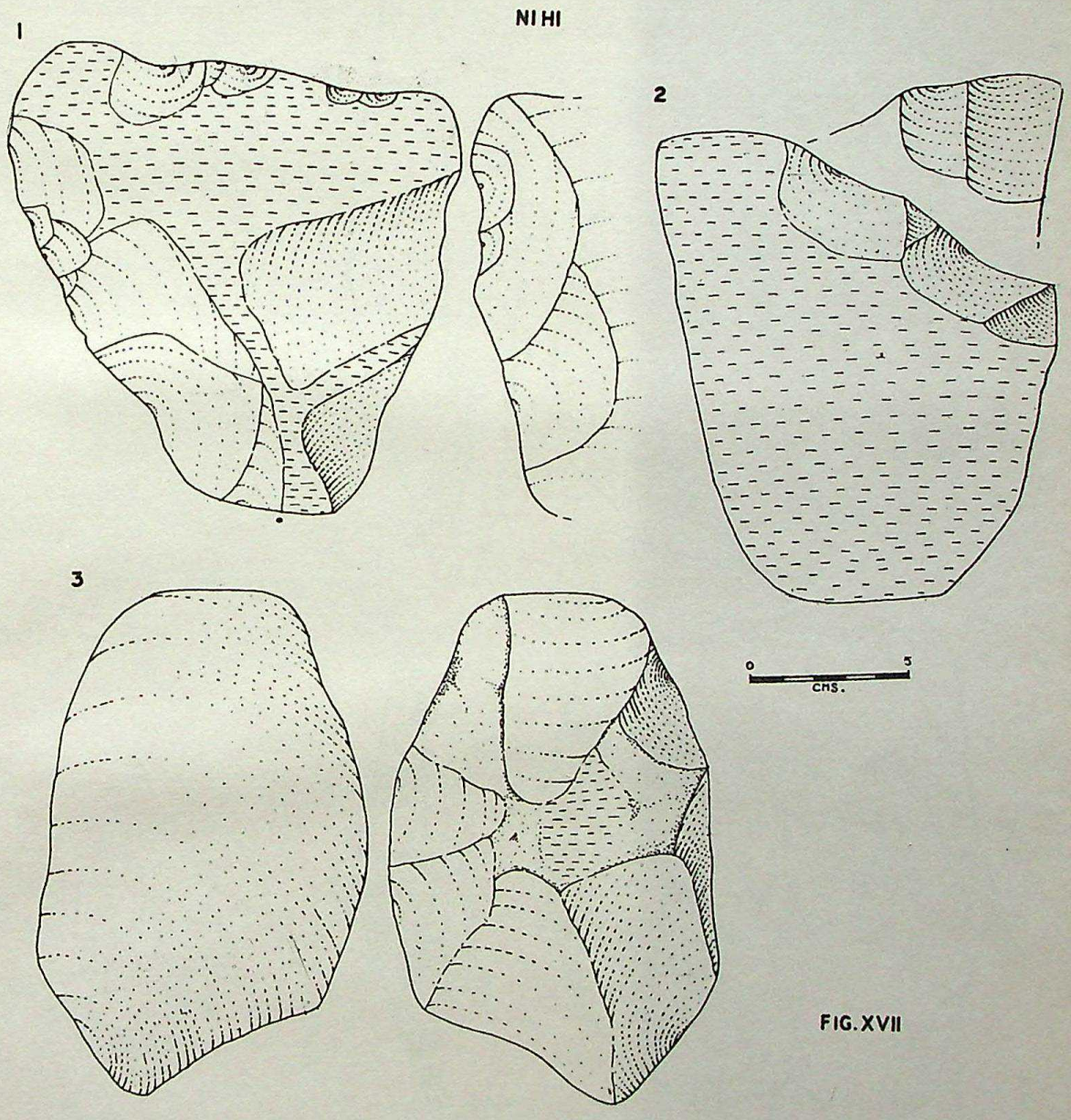
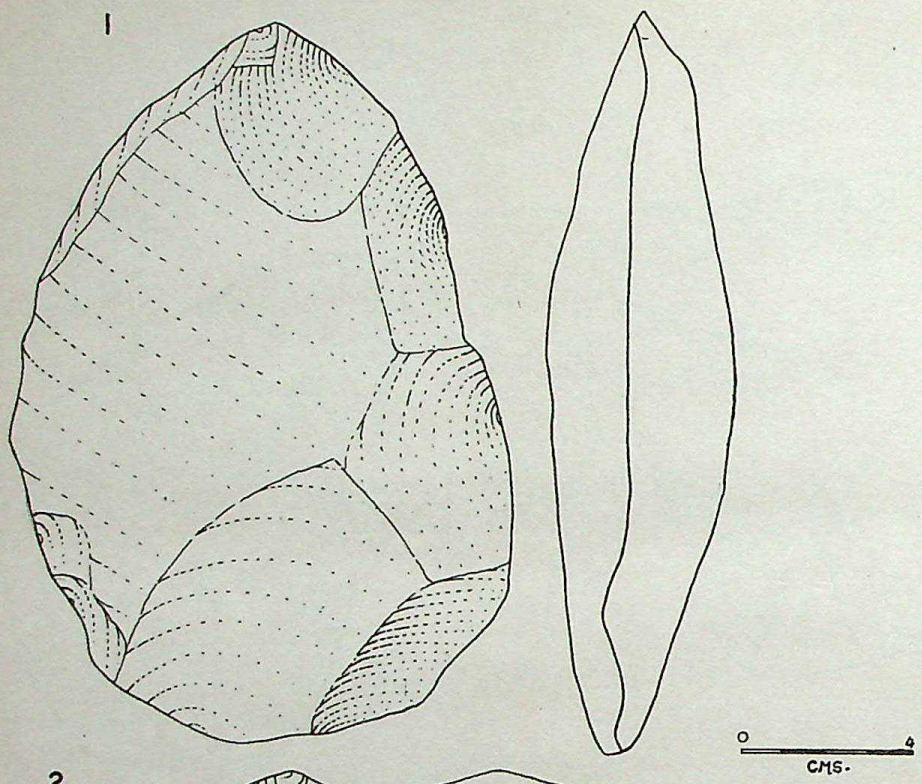


FIG. XVII

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

PARSIDHIA



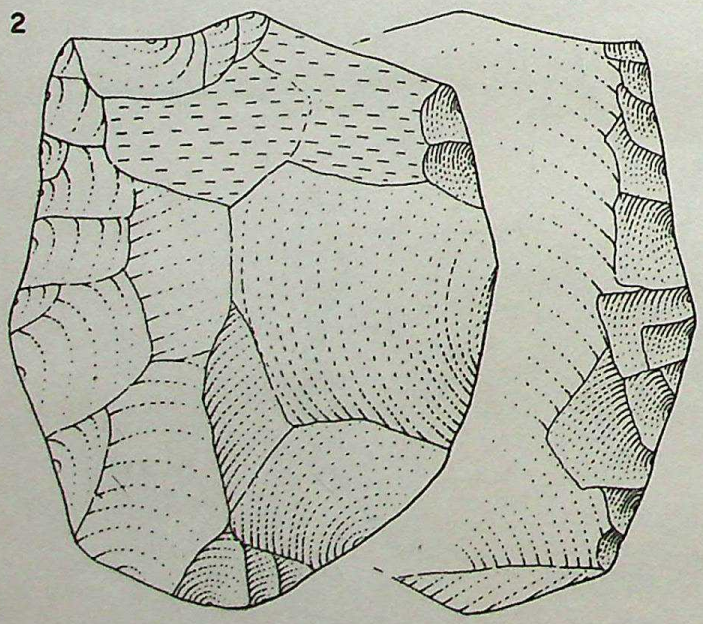


FIG. XVIII

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

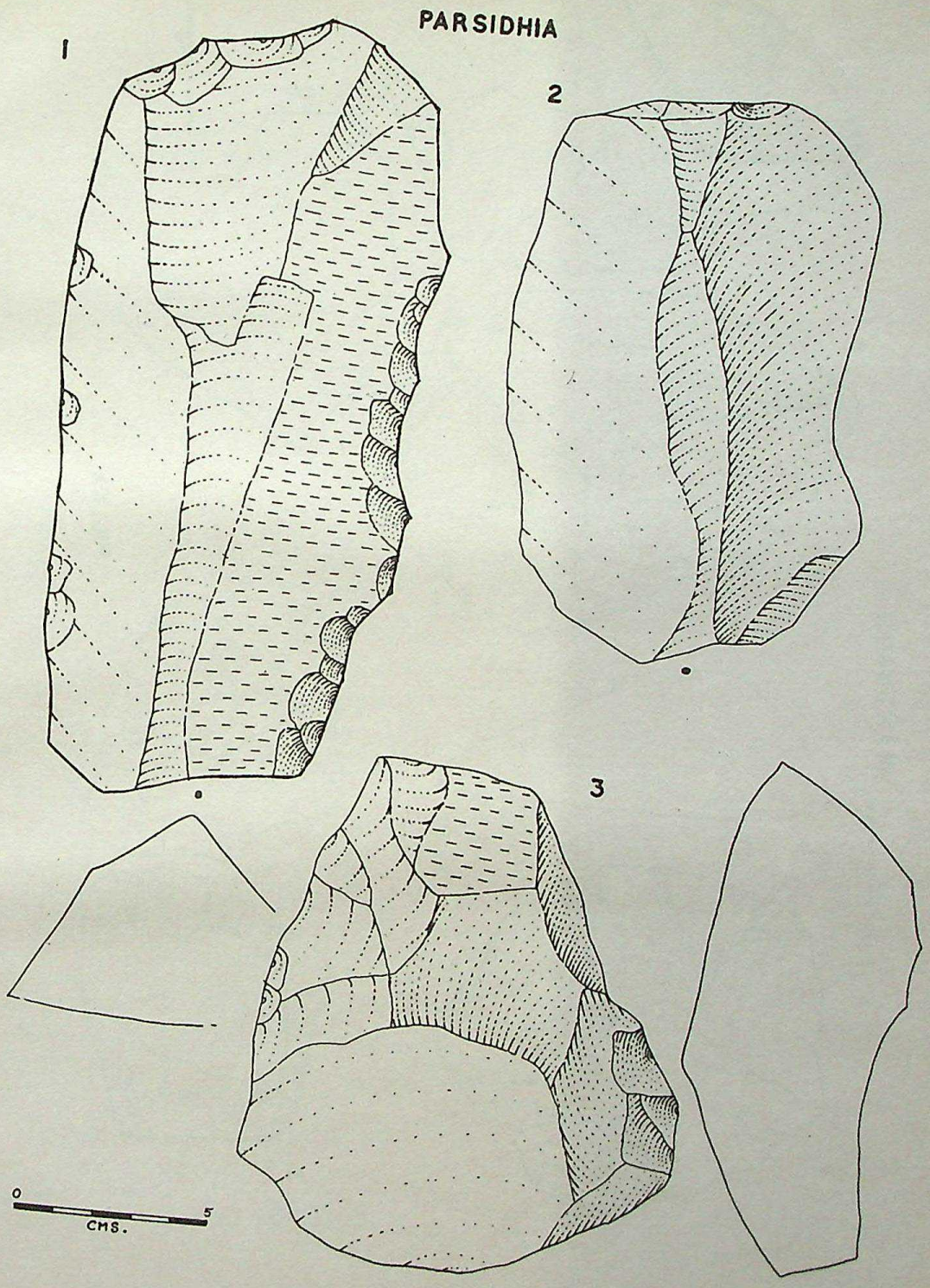


FIG. XIX

MAHUGARH

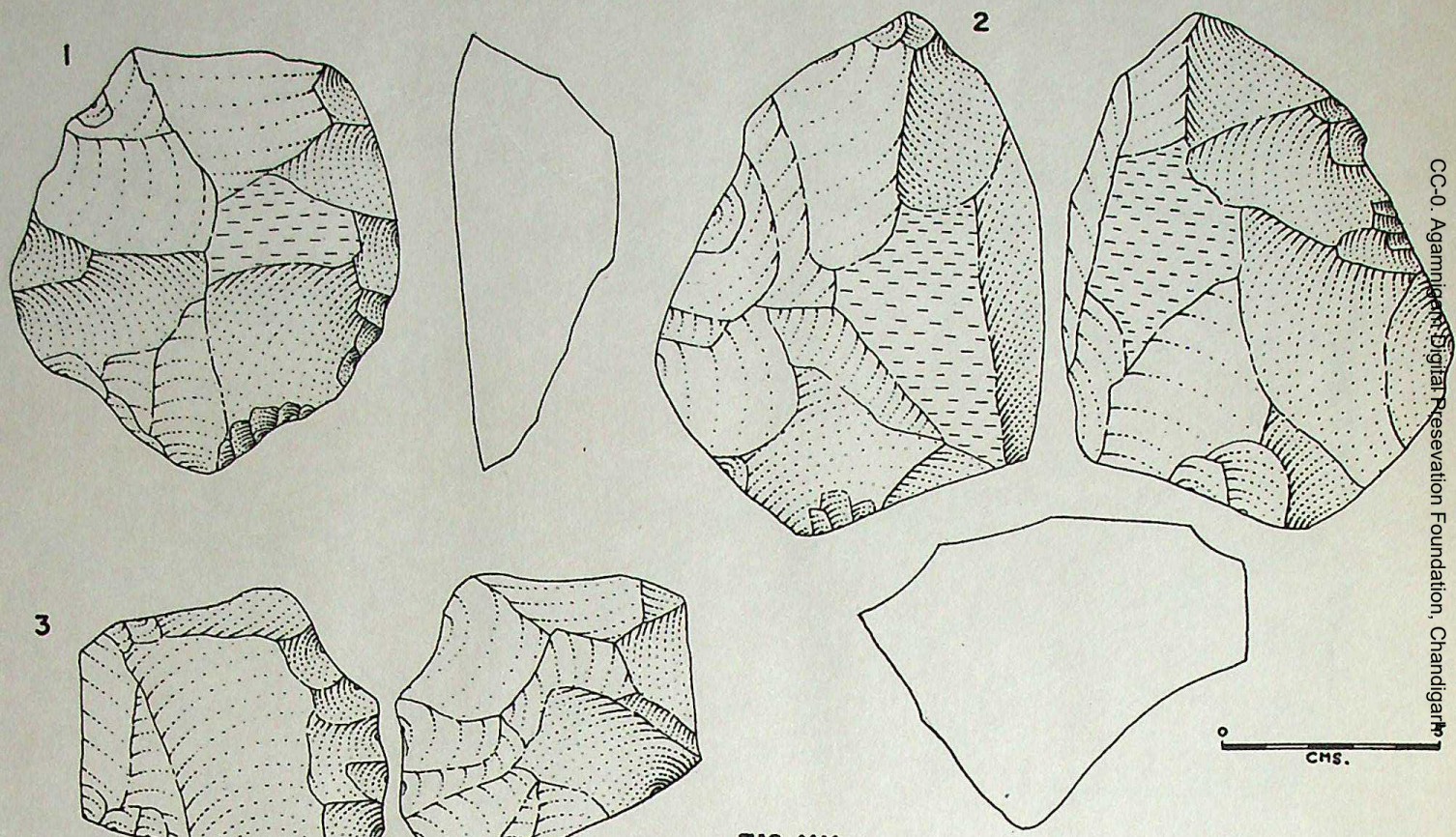
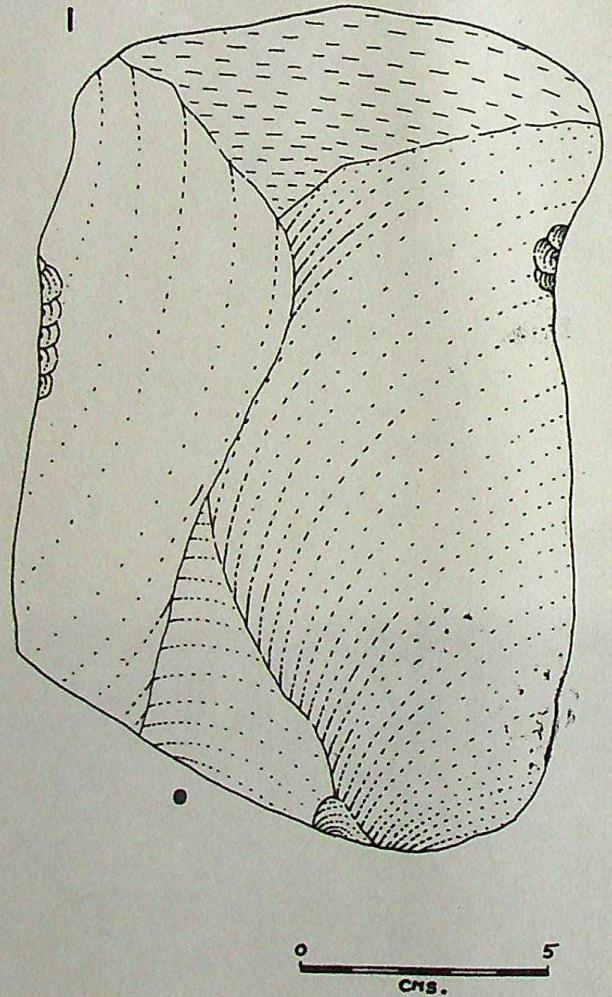


FIG. XX

CC-0. Agamnigam Digital Preservation Foundation, Chandigarh

MAHUGARH



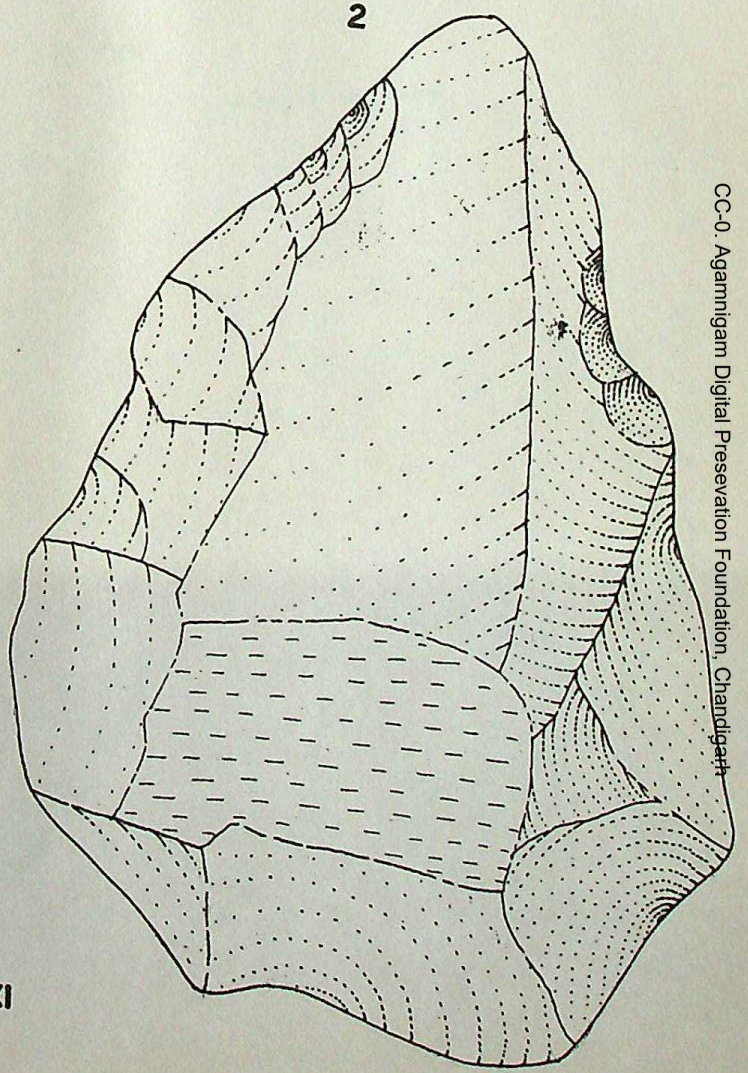


FIG. XXI

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

MAHUGARH

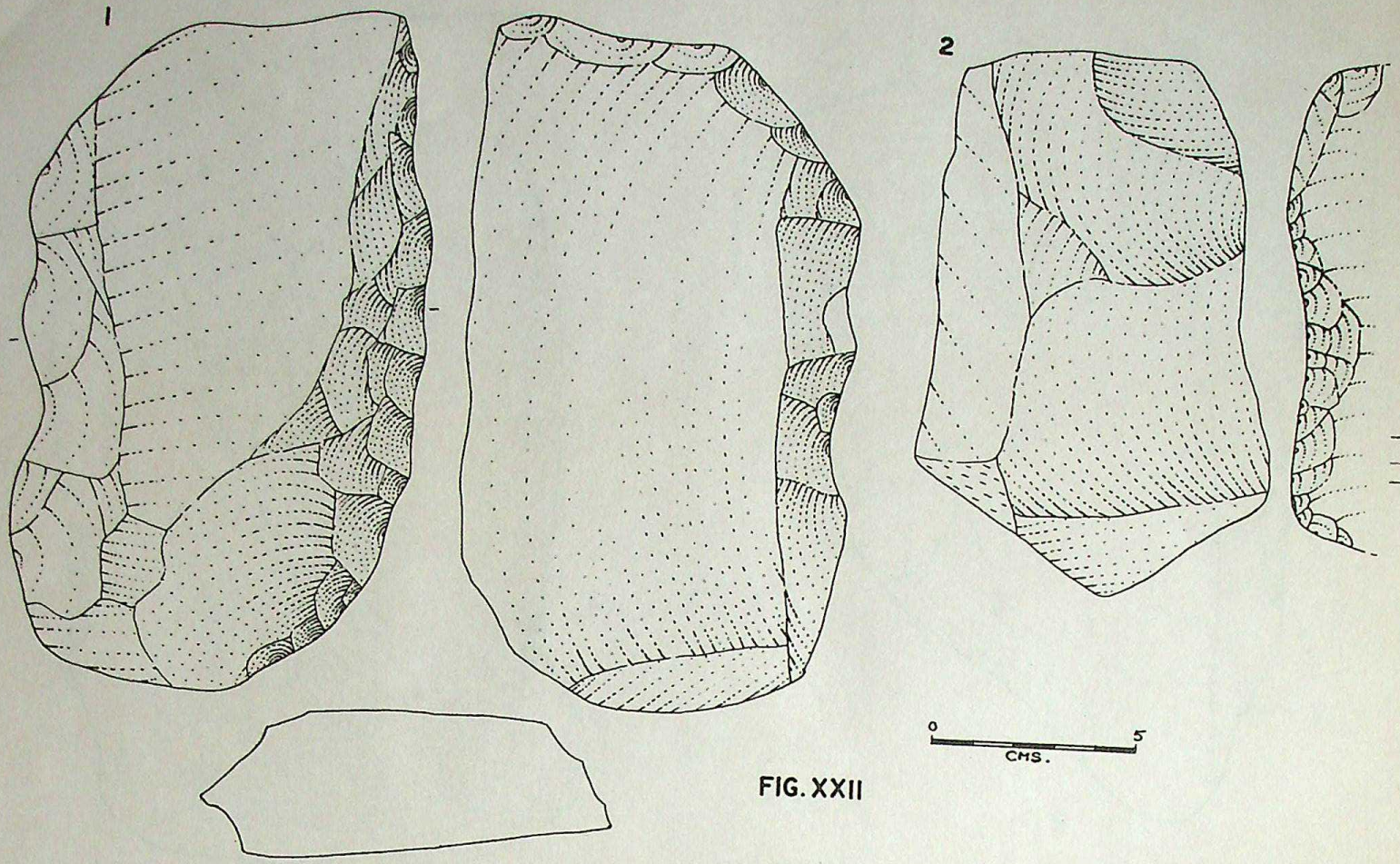


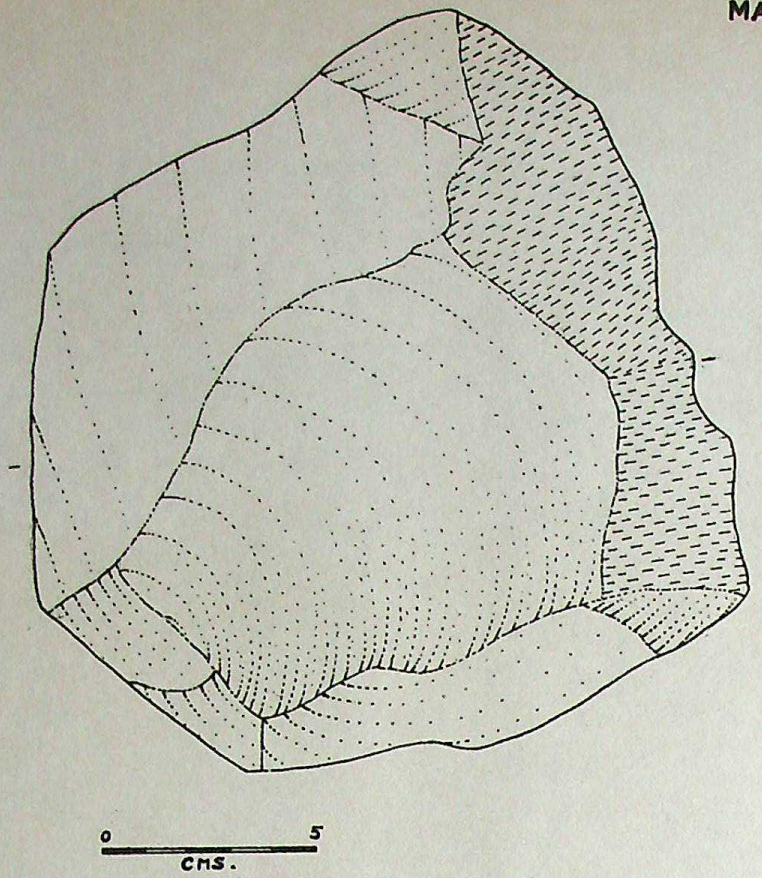
FIG. XXII

CC-0. Agamnigam Digital Preservation Foundation, Chandigarh

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

FIG. XXIII.

MAHUGARH



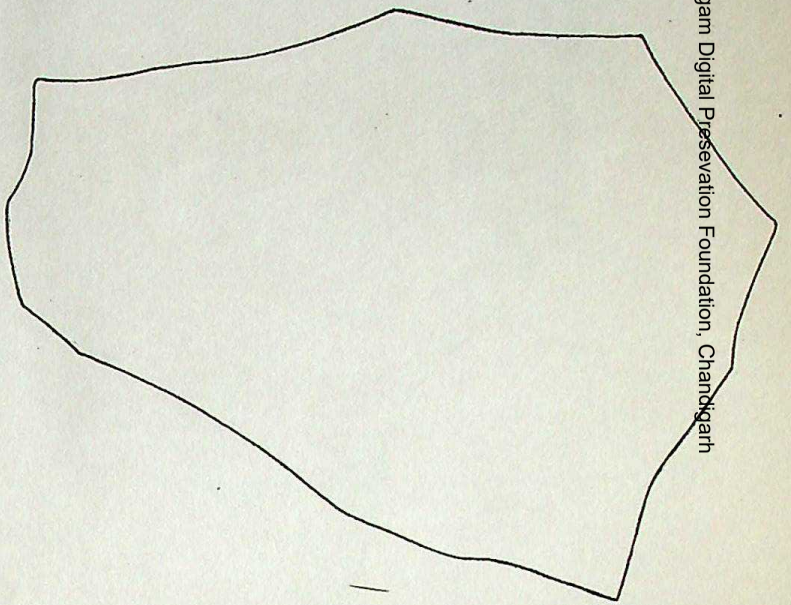


FIG. XXIV

CC-0. Agamnigam Digital Preservation Foundation, Chandigarh

CC-0. Agamnigam Digital Preservation Foundation, Chandigarh

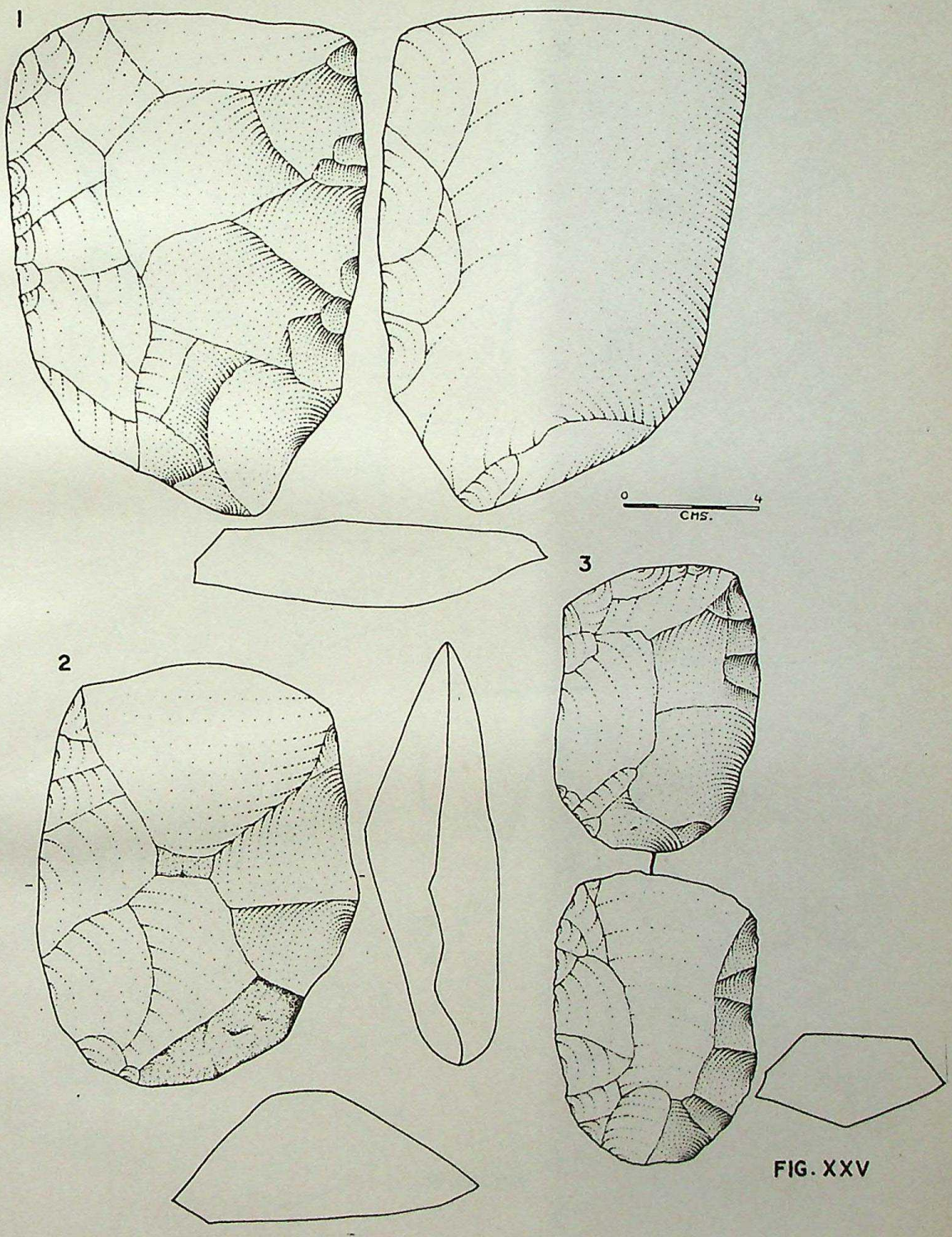


FIG. XXV

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

LALITPUR

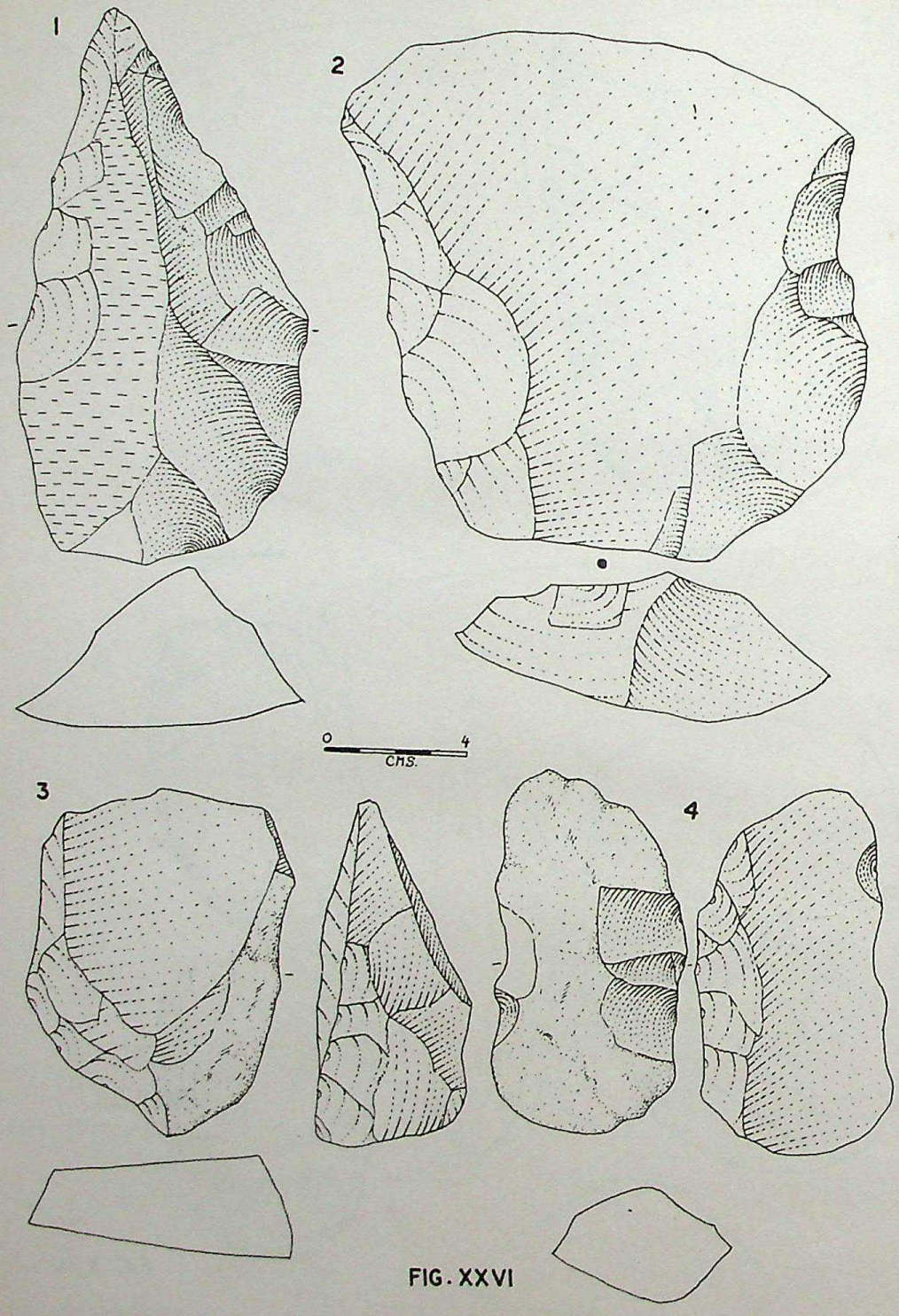


FIG. XXVI

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

LALITPUR

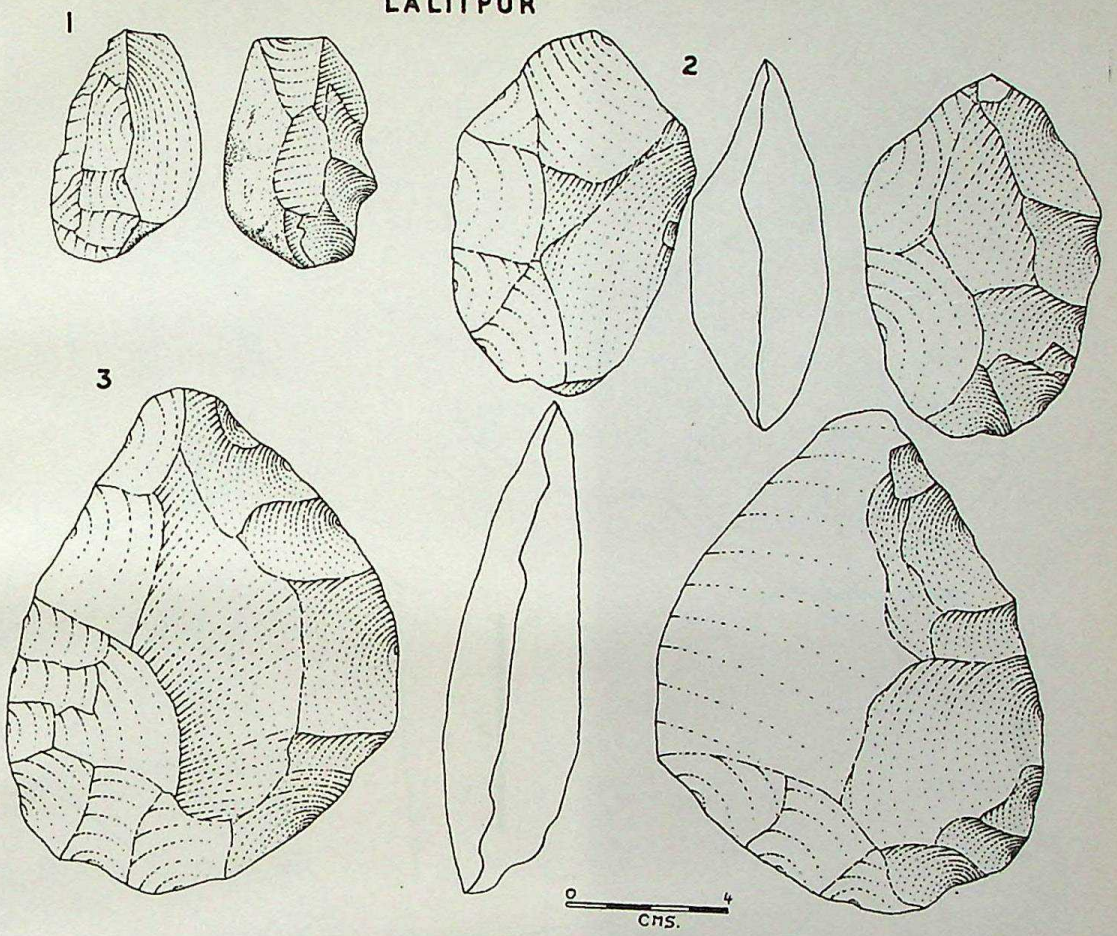


FIG. XXVII

LALITPUR

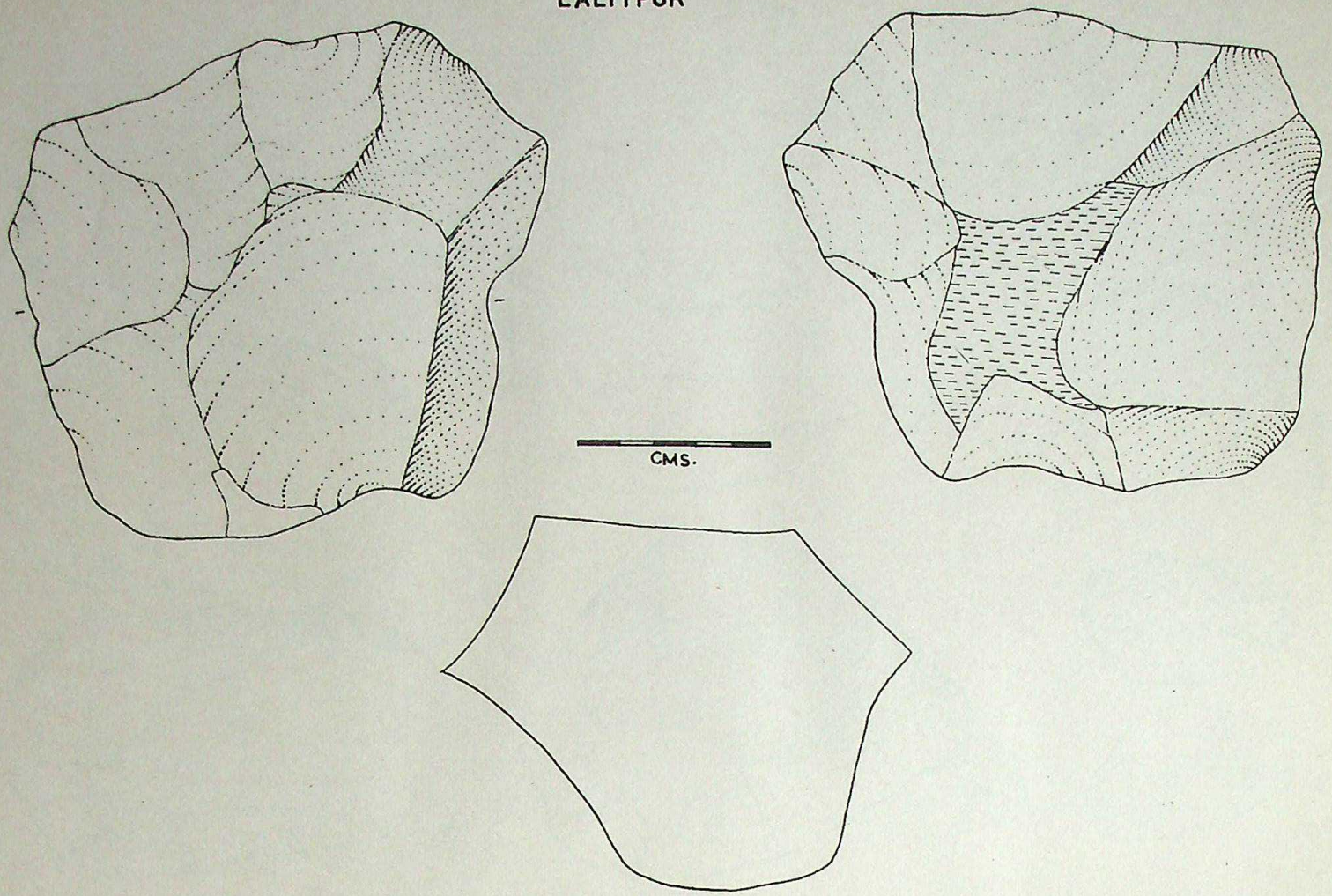


FIG. XXVIII

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

SINGRAULI

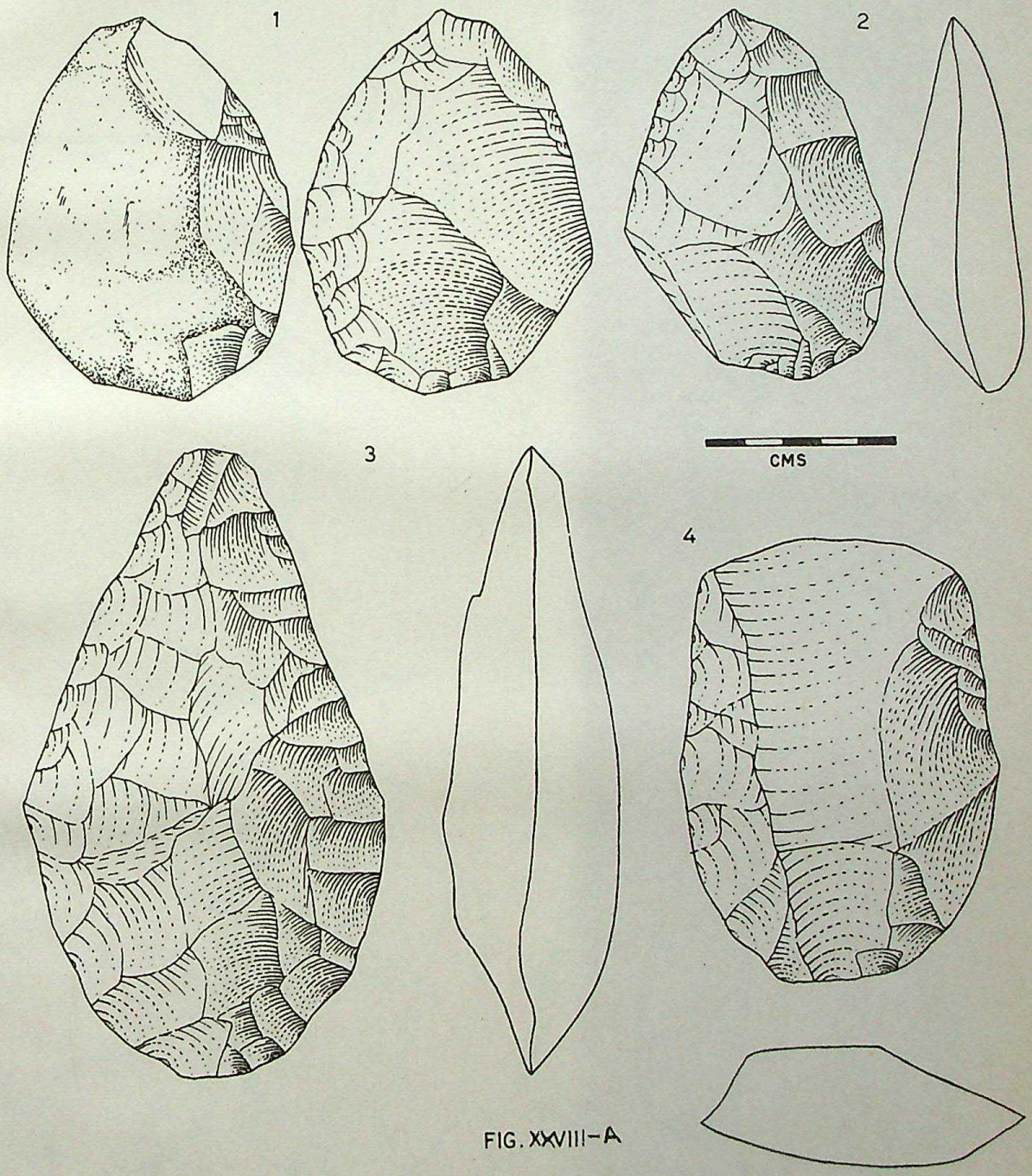


FIG. XXVIII-A

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

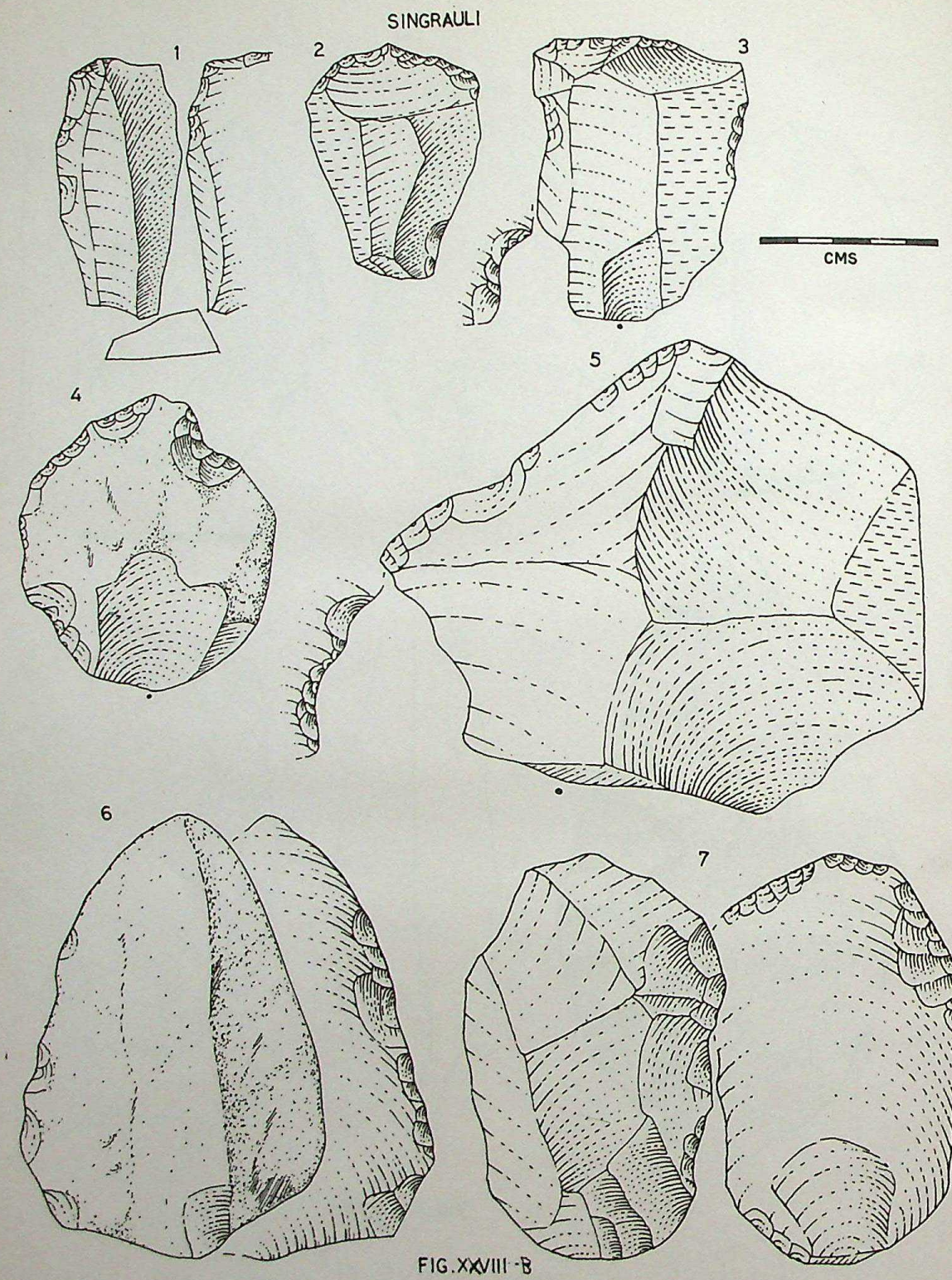


FIG. XXVIII-B

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

LAHCHURA. 2

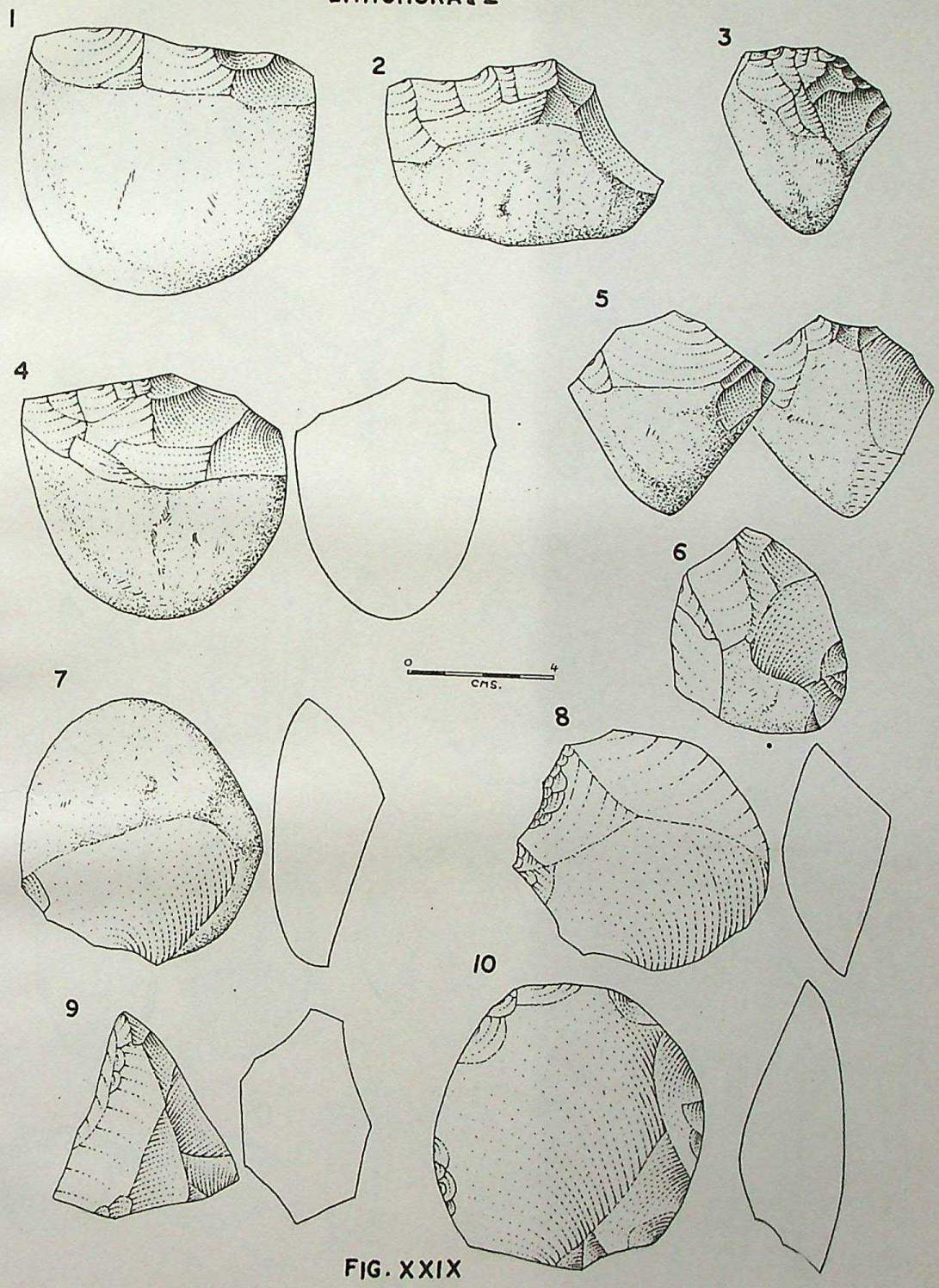


FIG. XXIX

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

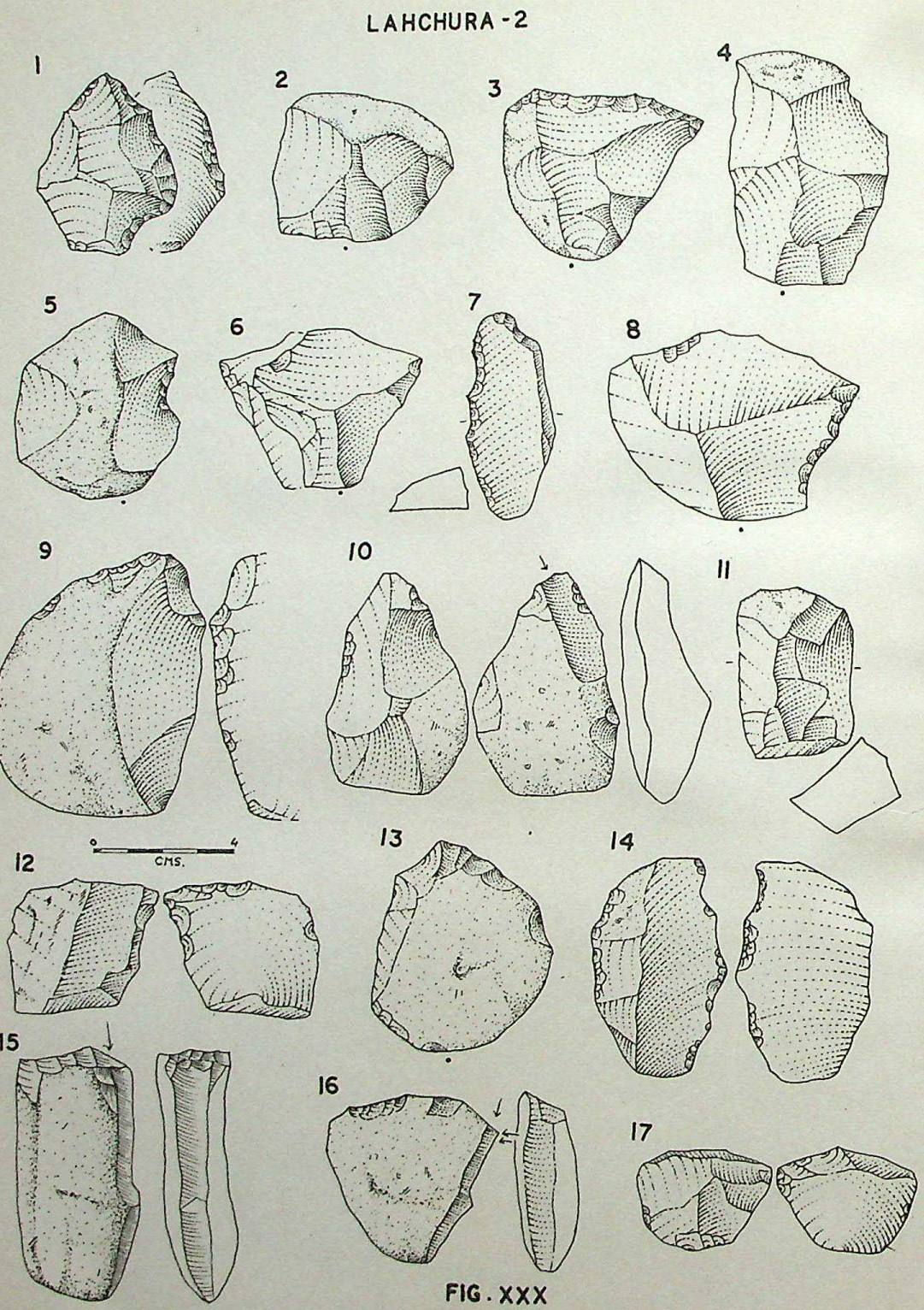


FIG. XXX

CC-0. Agamnigam Digital Preservation Foundation, Chandigarh

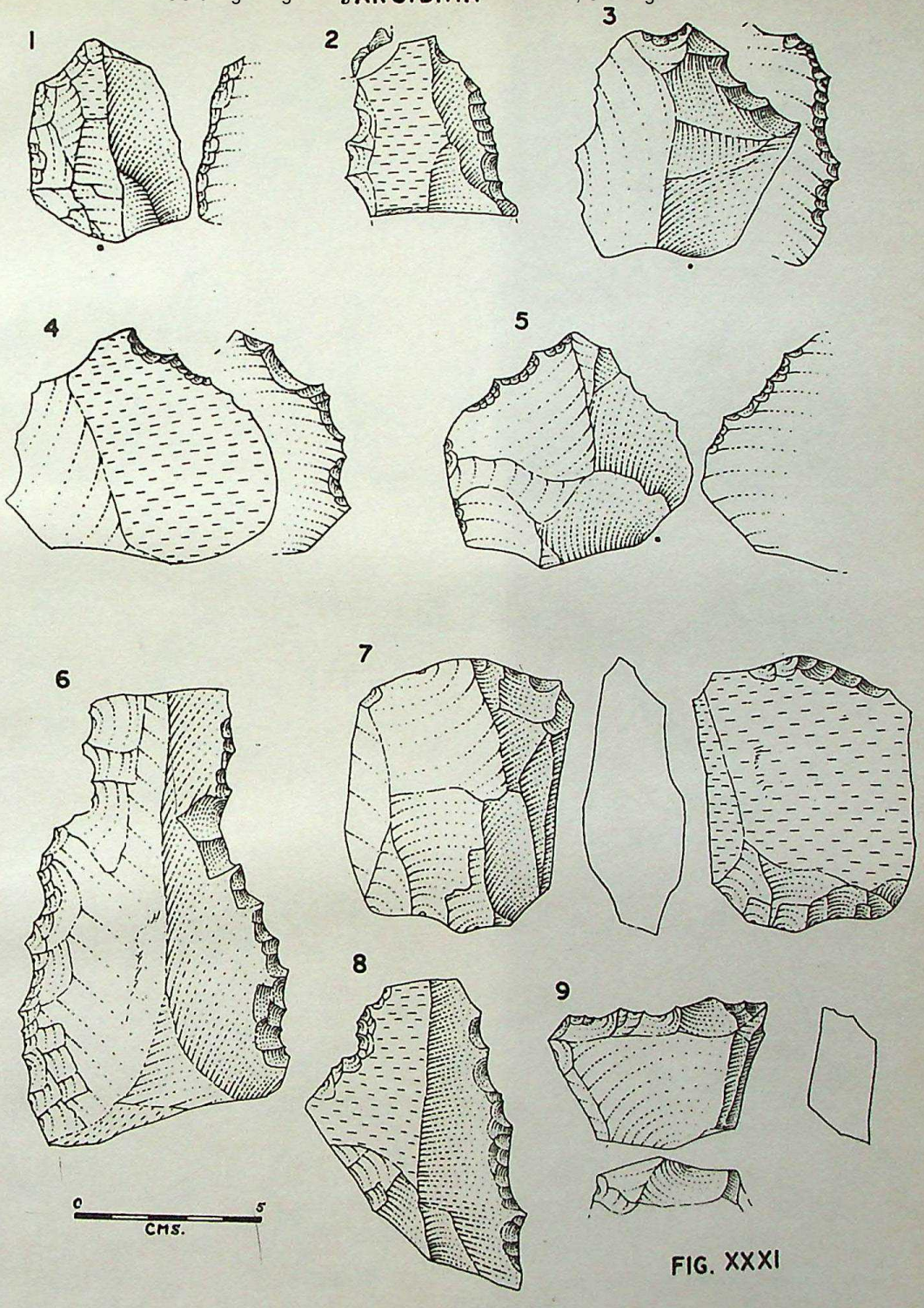


FIG. XXXI

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

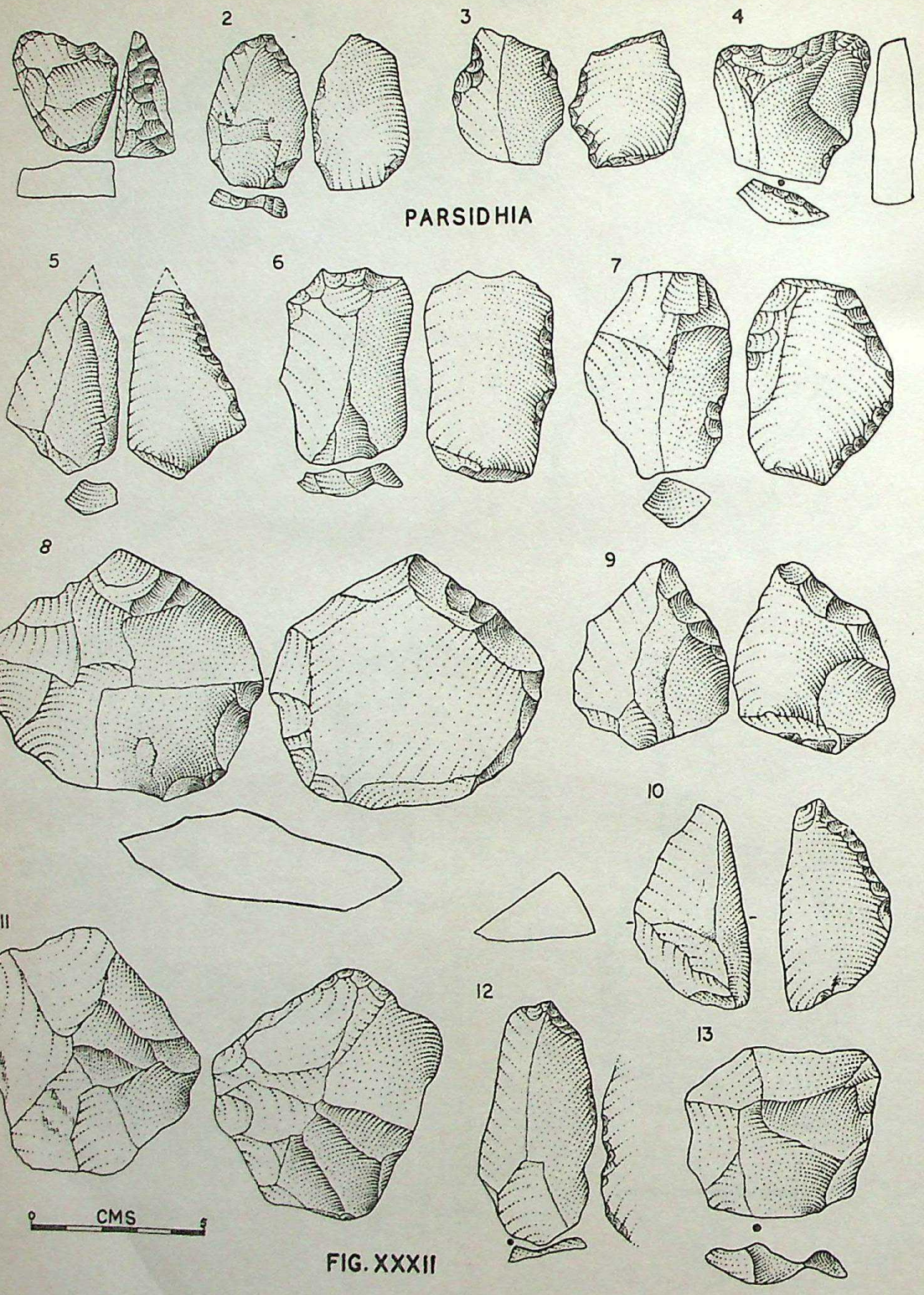


FIG. XXXII

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

CHAINPURA

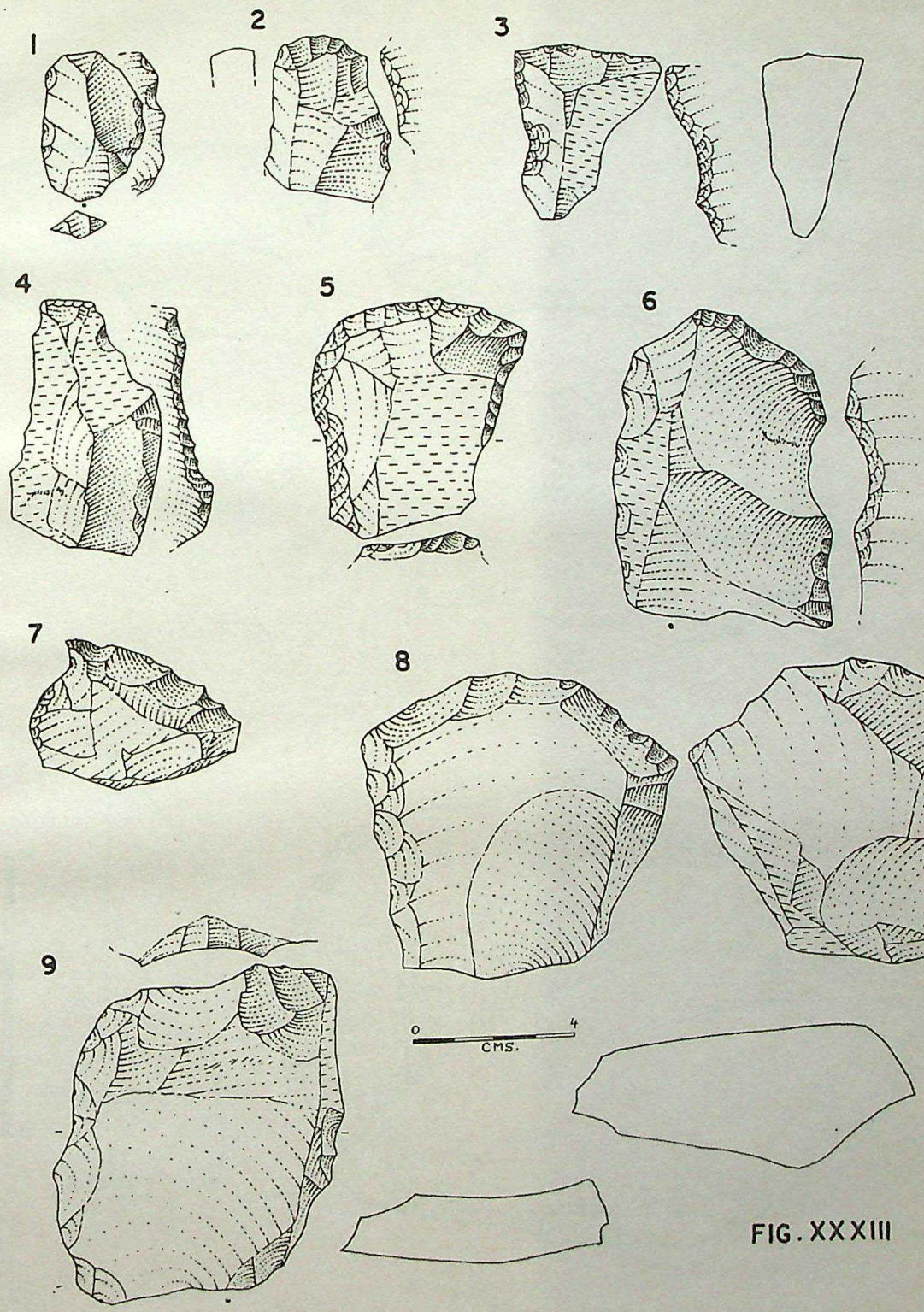


FIG. XXXIII

BAITHAKWA

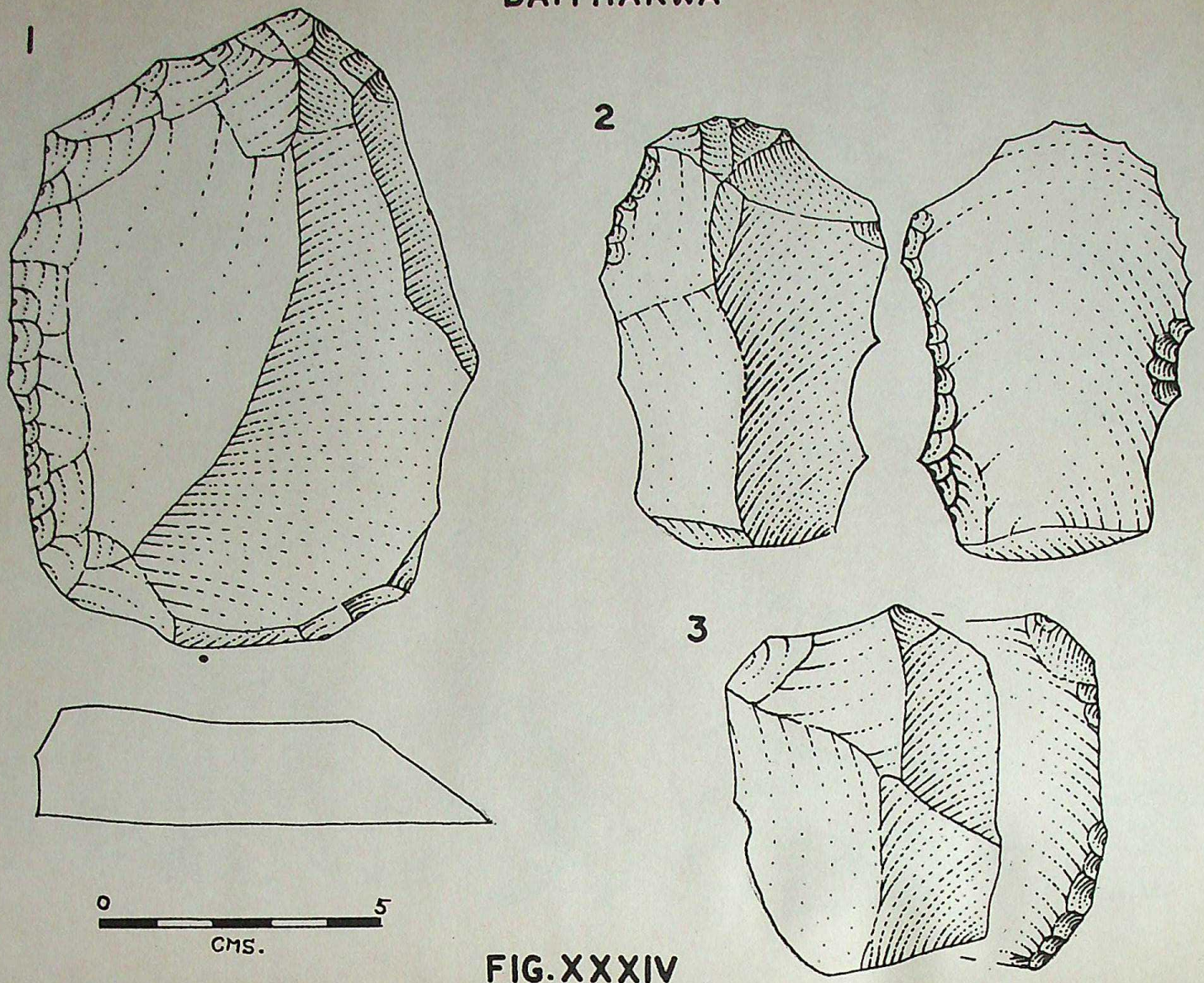


FIG. XXXIV

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

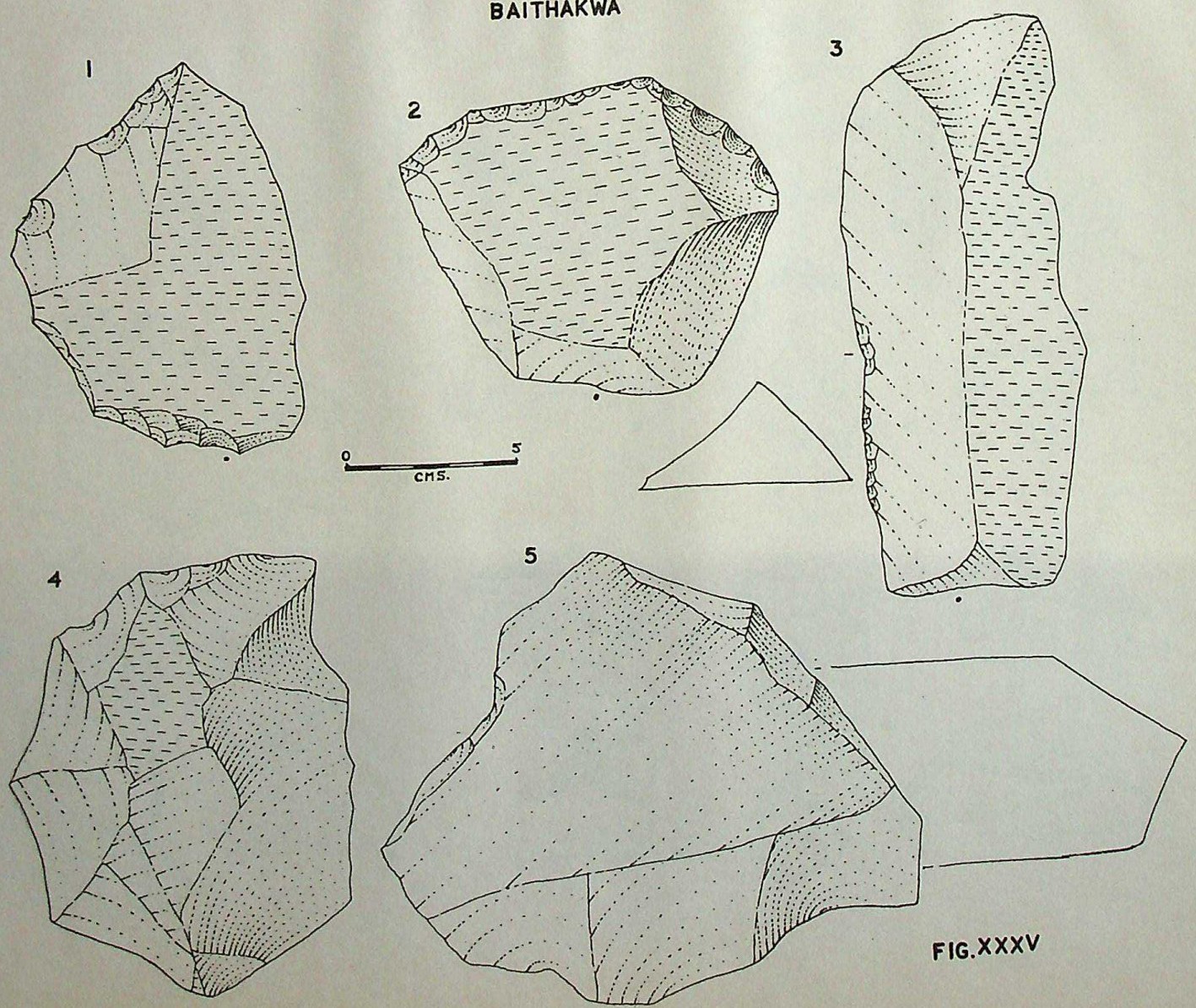


FIG.XXXV

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

SIDDHPUR - I

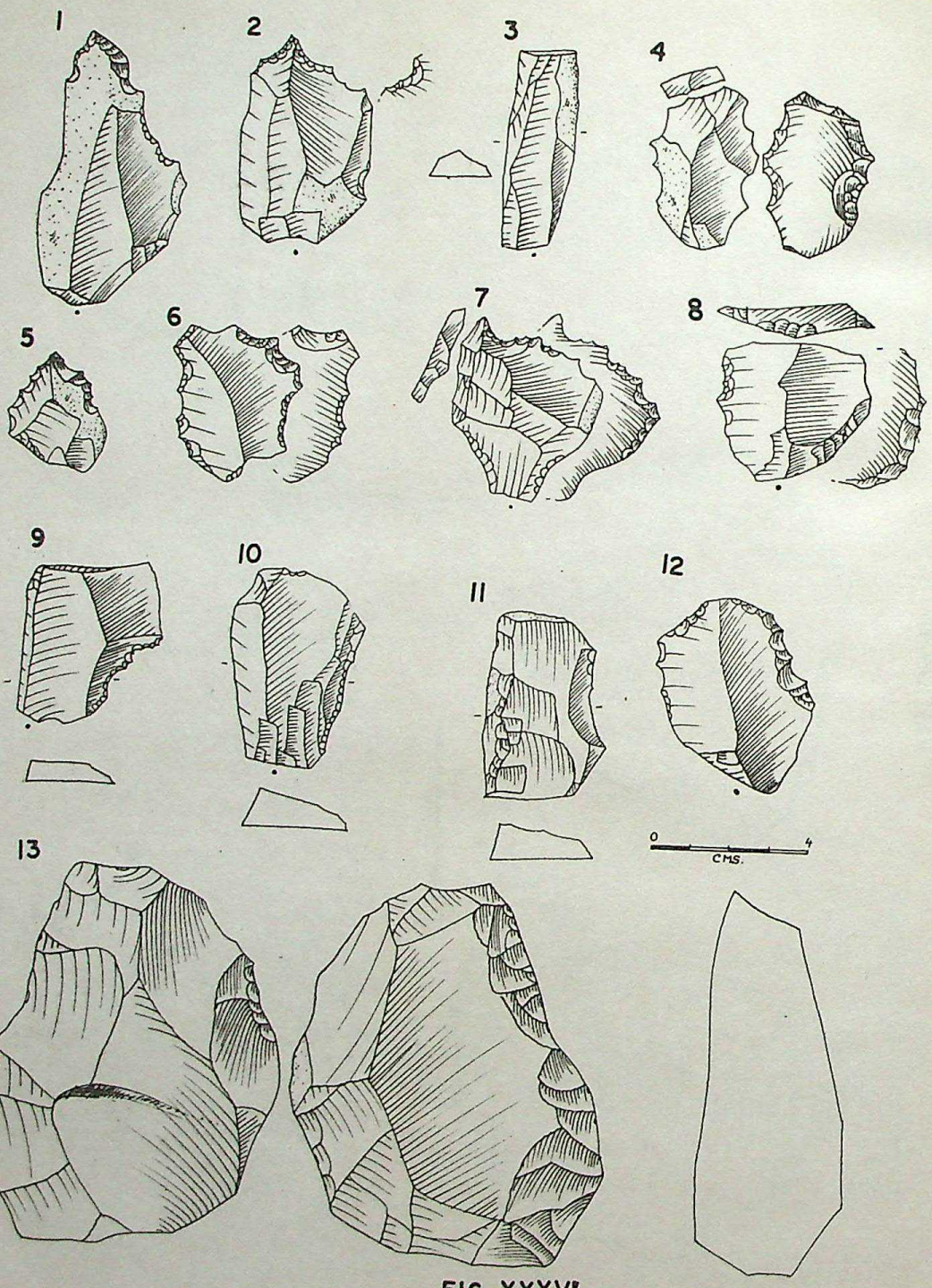


FIG. XXXVI

DAIYA

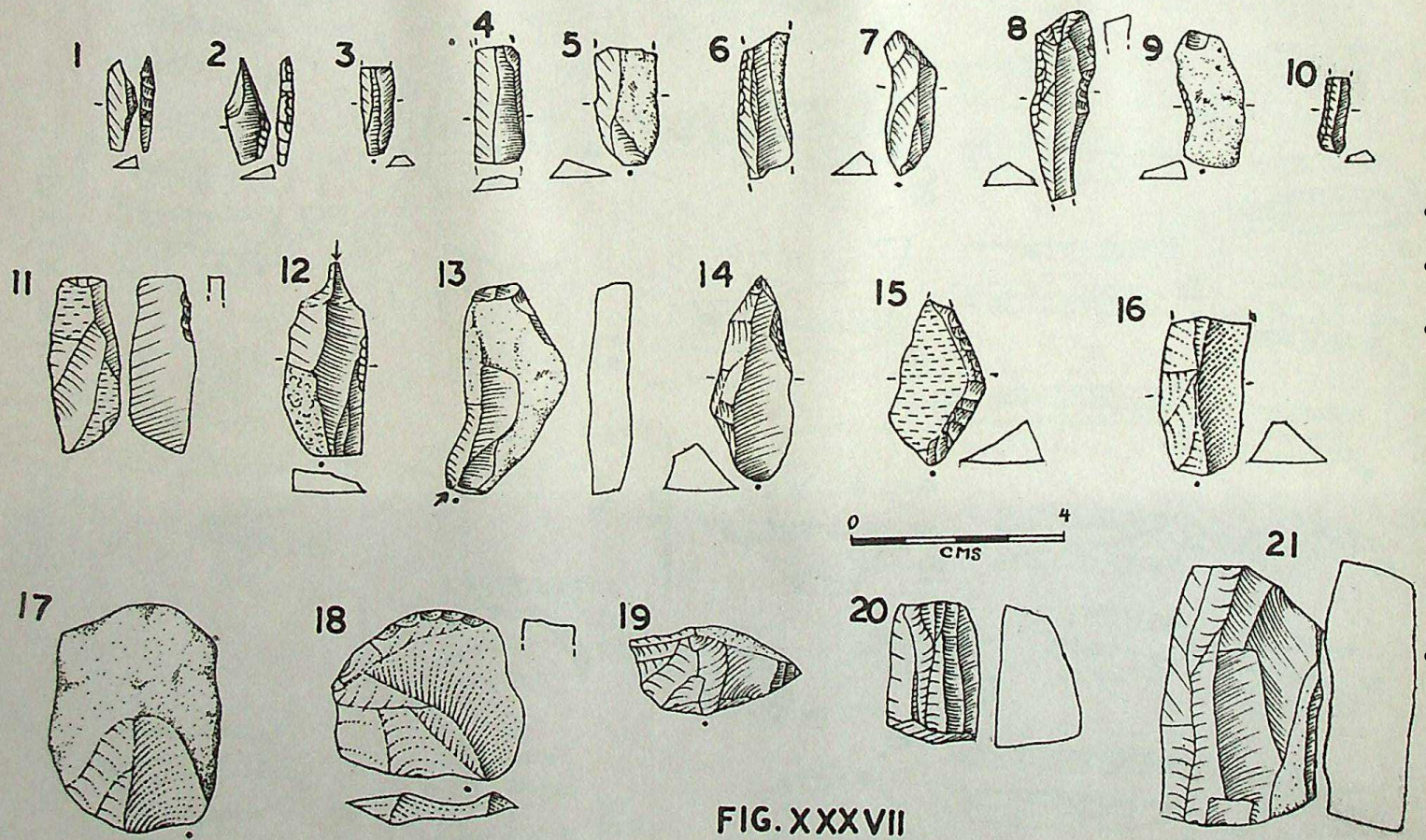


FIG. XXXVII

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

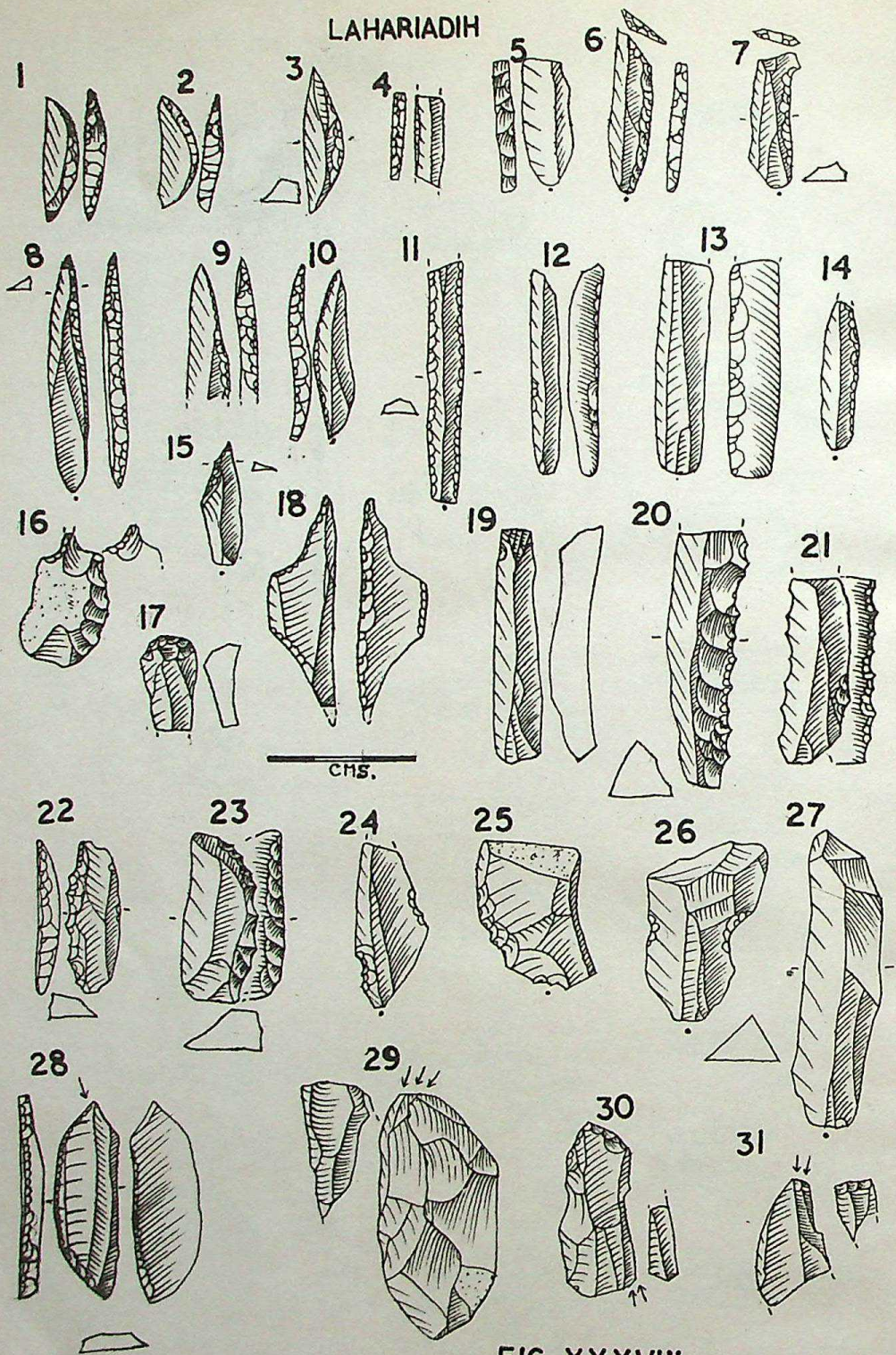


FIG. XXXVIII

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

LAHARIADIH

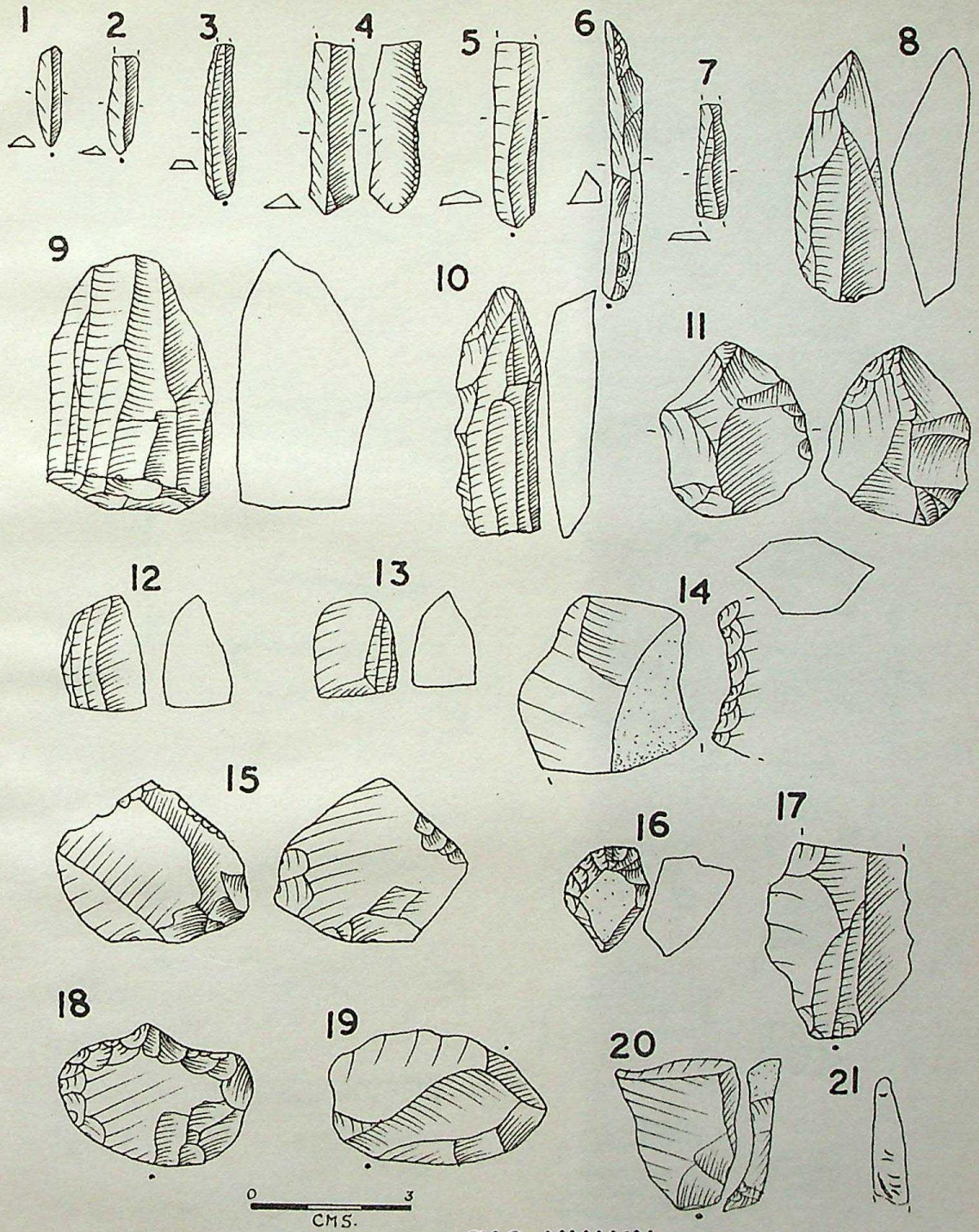


FIG. XXXIX

AHIRPURWA

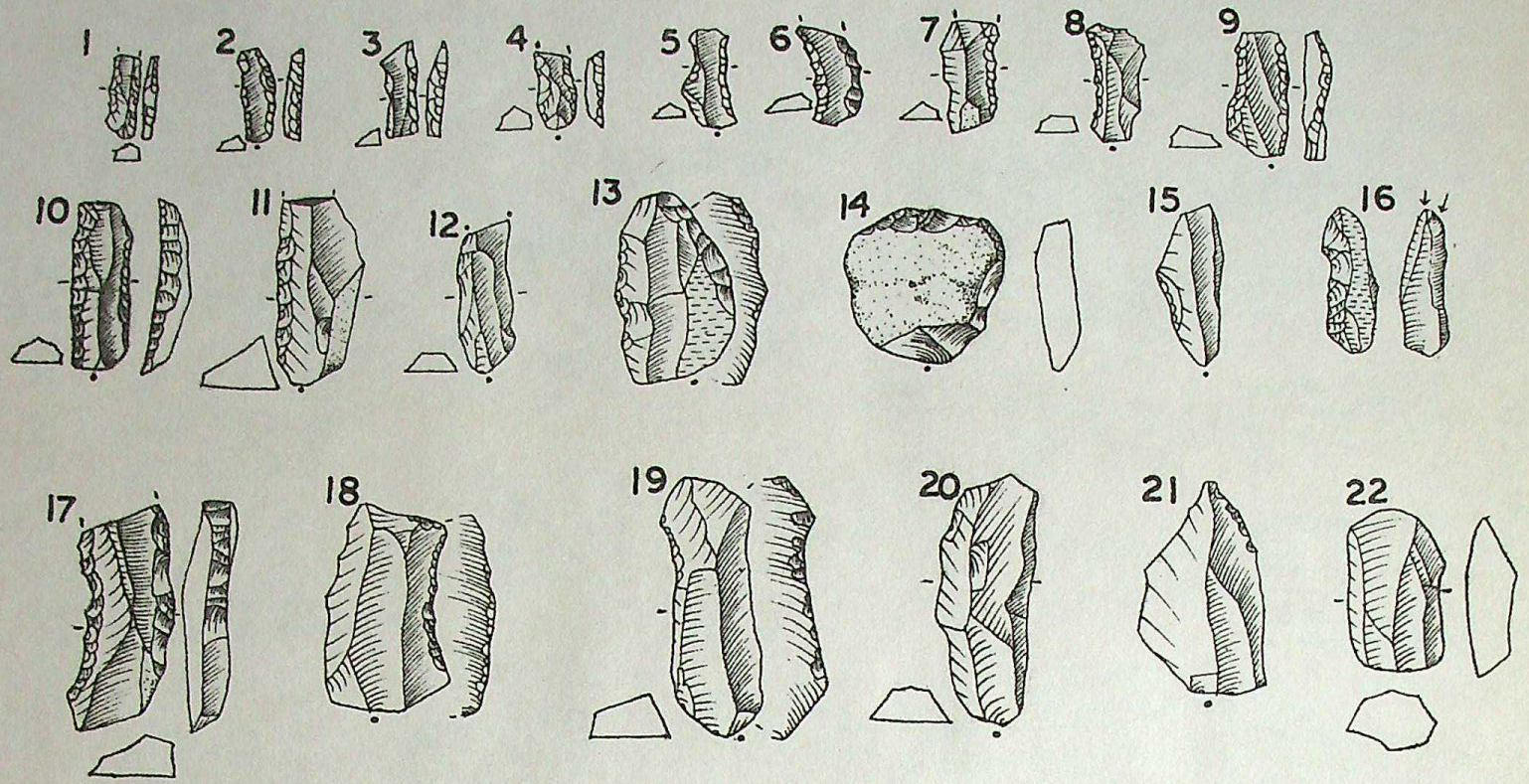


FIG. XL

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

SIDDHPUR

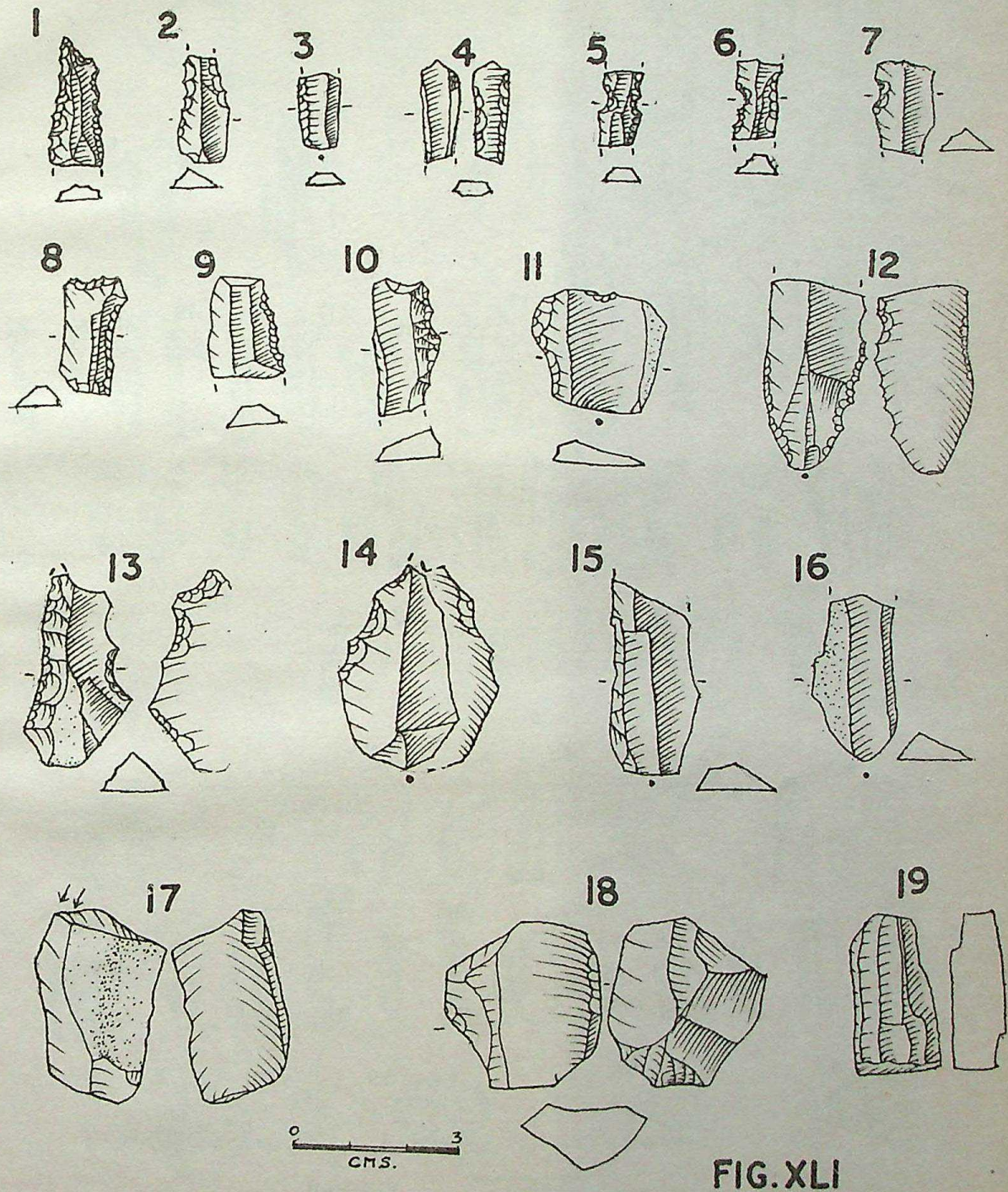


FIG. XLI

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

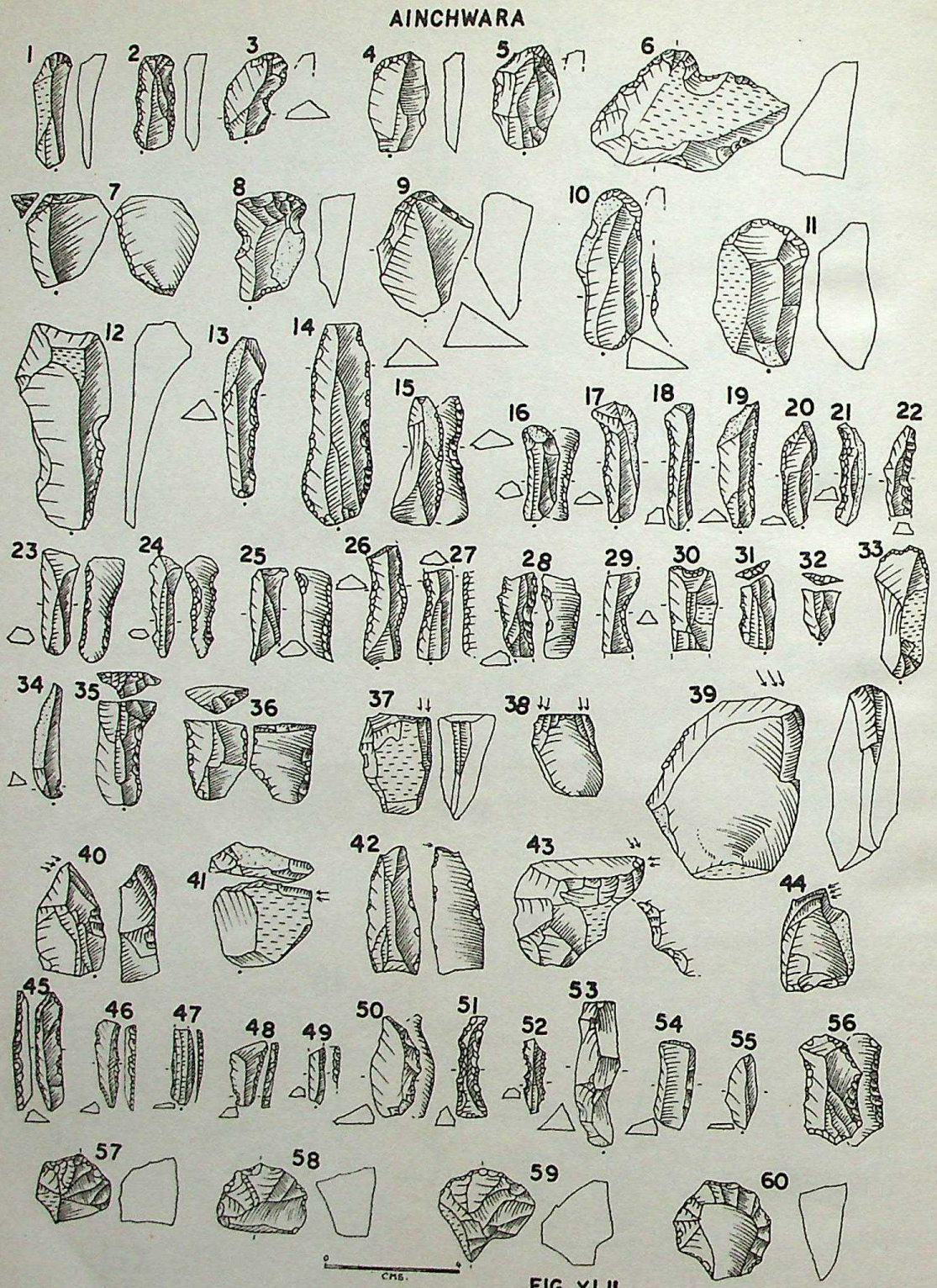


FIG. XLII

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

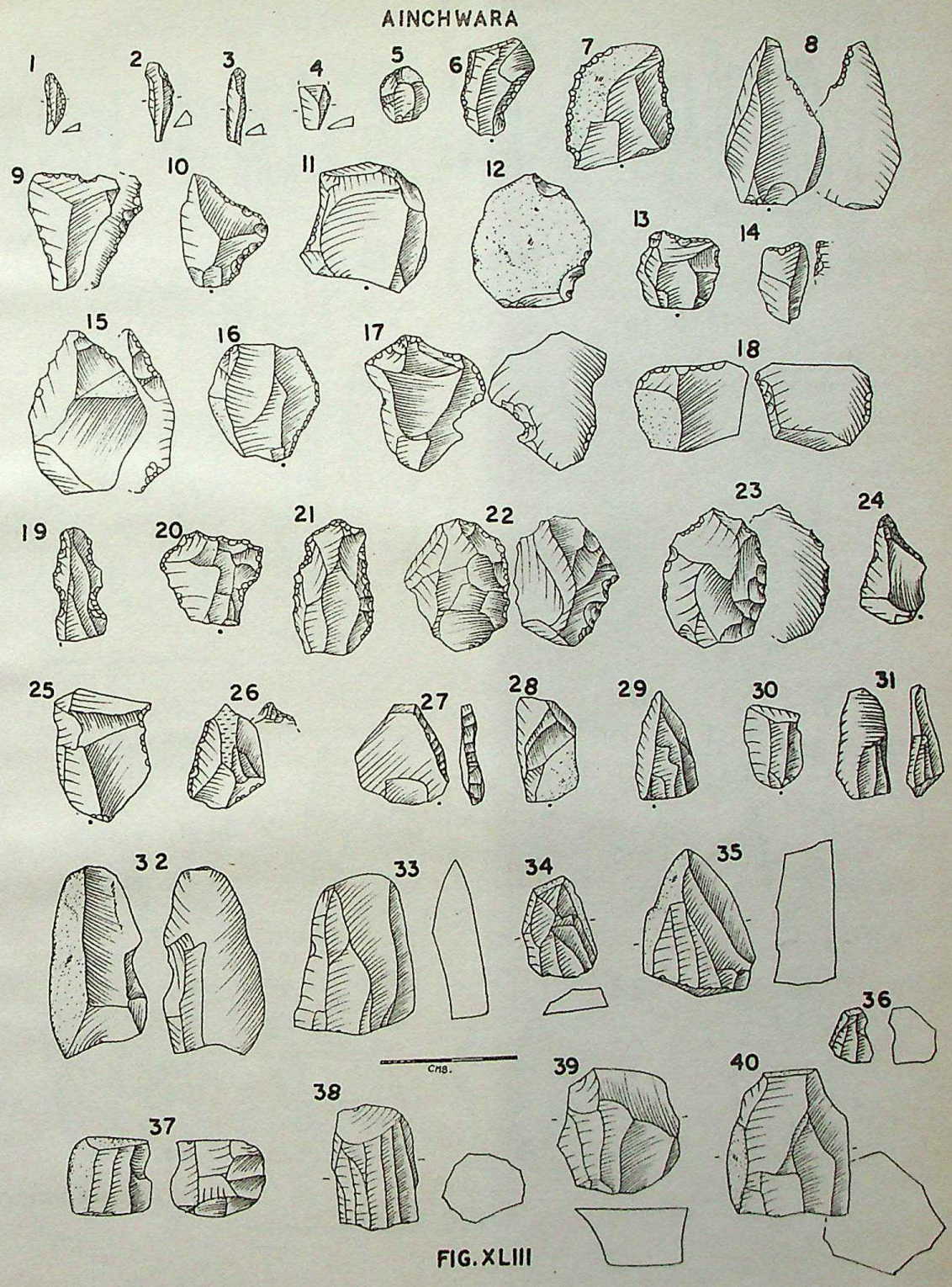


FIG. XLIII

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

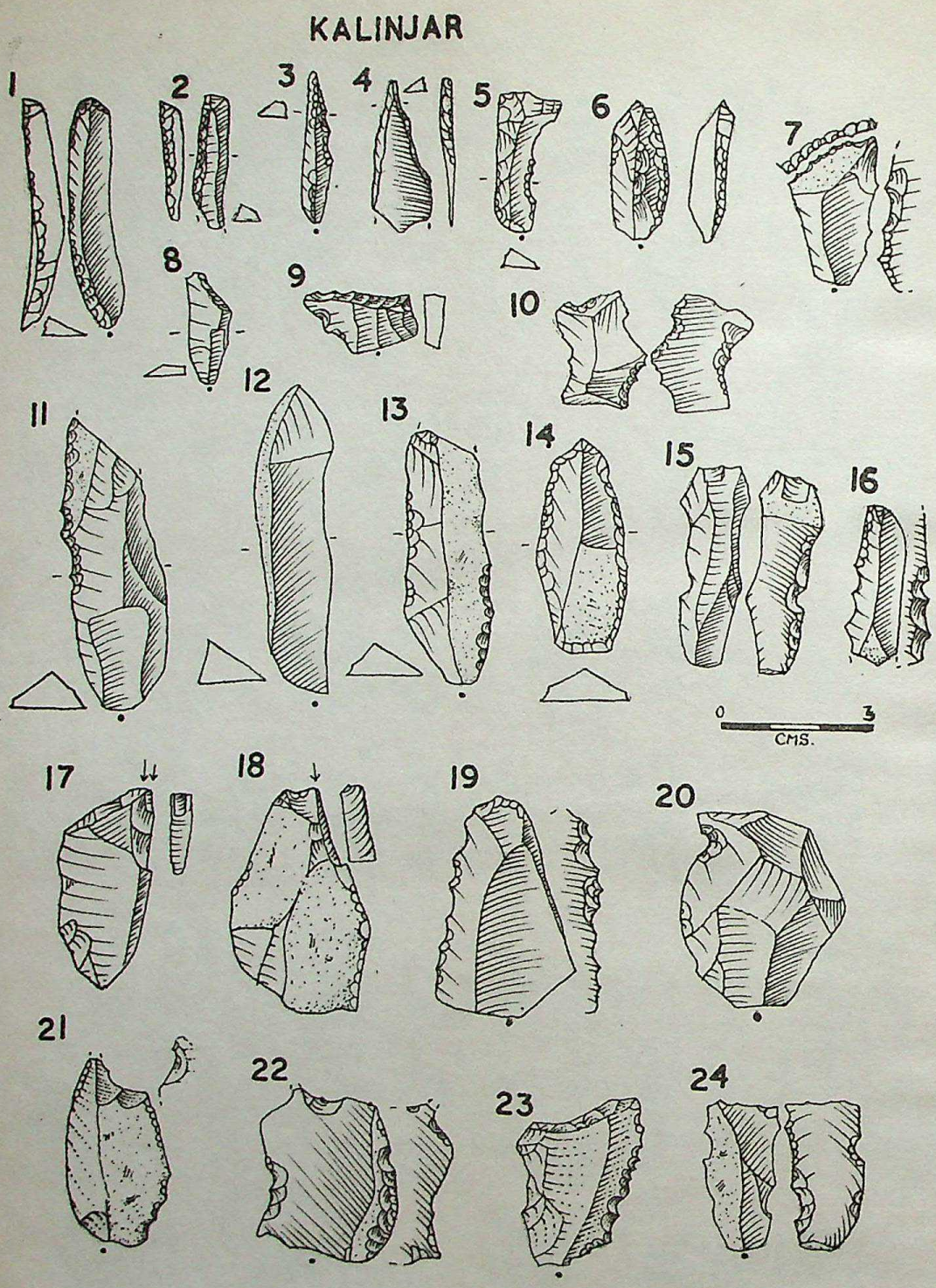


FIG. XLIV

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

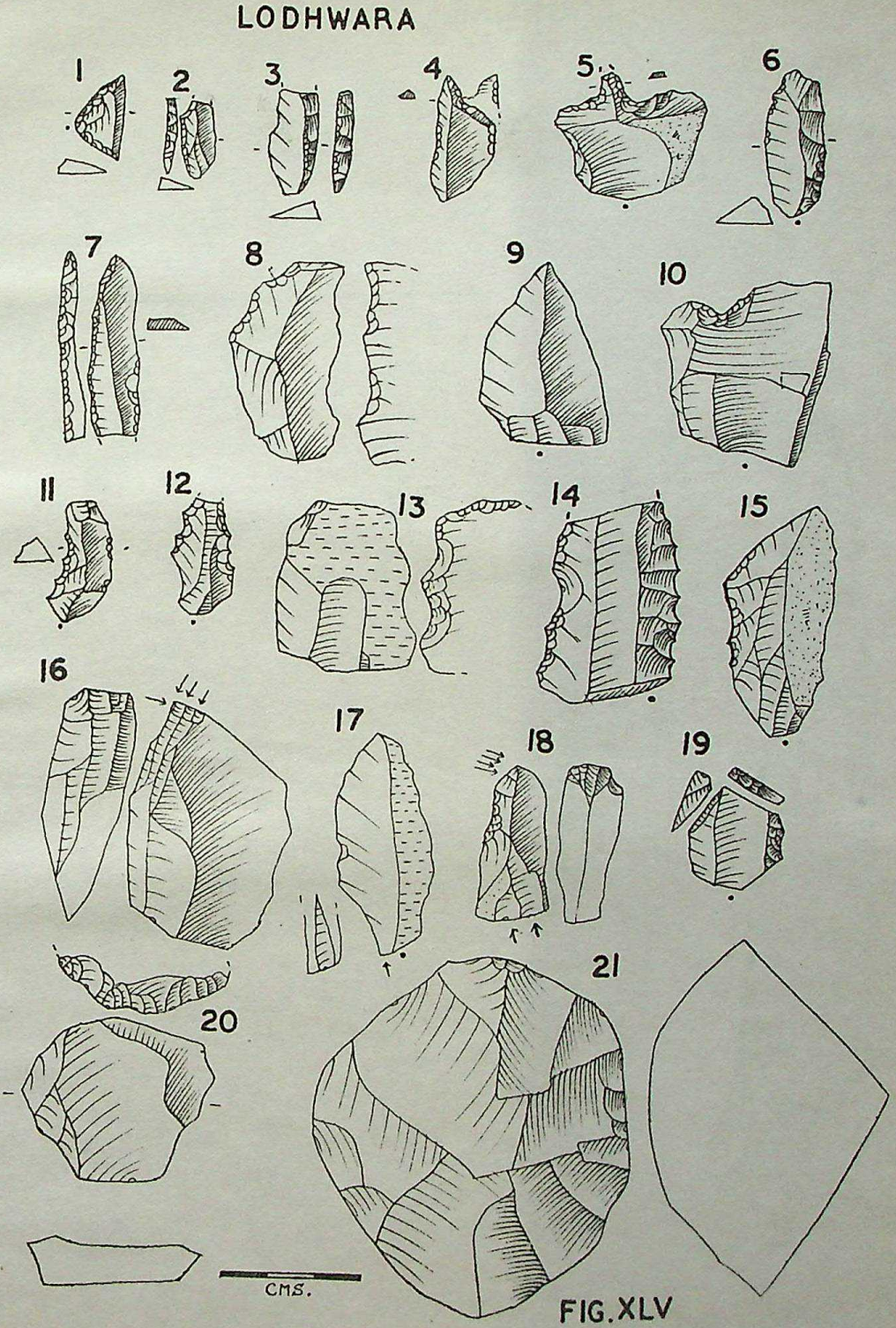


FIG. XLV

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

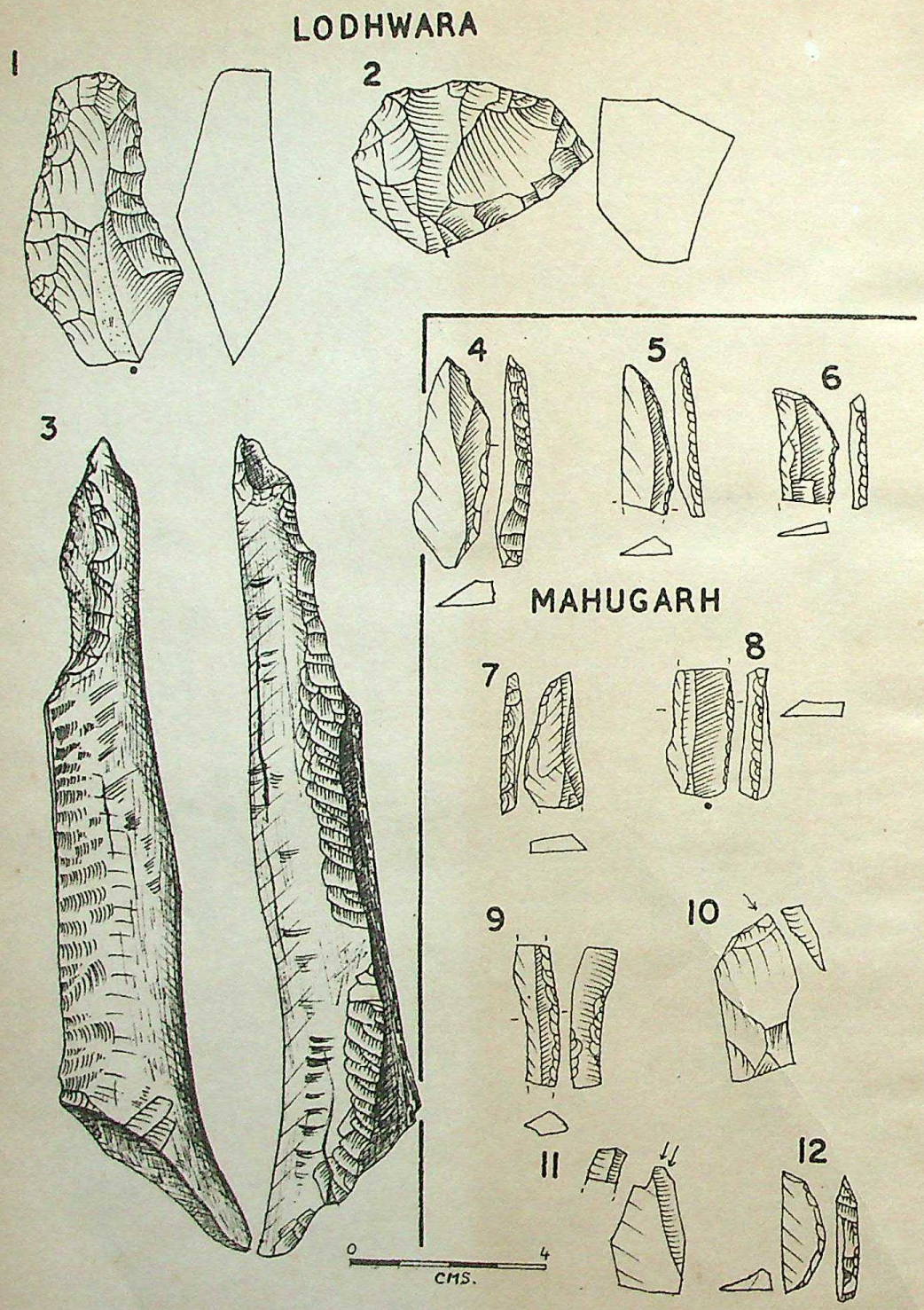


FIG. XLVI

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

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